C 21.5: 961/2

Vol. 961 Number 2

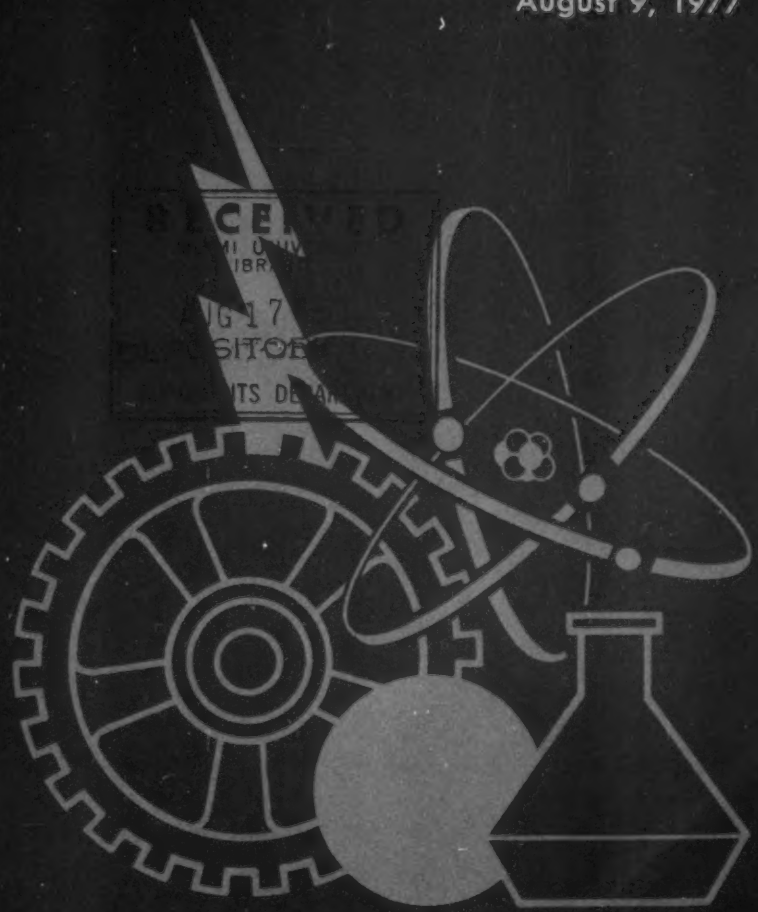
OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

August 9, 1977



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August 9, 1977 Volume 961 Number 2

CONTENTS

	Page
Patent and Trademark Notices	
Reissue Applications Filed	961 OG 8
Patent Notices	
Certificates of Correction for the Week of August 9, 1977	961 OG 9
Condition of Patent Applications	961 OG 10
Reissue Patents Granted (29,342)	479
Plant Patents Granted (4,090)	483
Patents Granted	
General and Mechanical (4,040,123)	485
Chemical (4,040,779)	705
Electrical (4,041,236)	829
Design Patents Granted (245,291)	941
Index of Patentees	PI 1
Cross Reference of Published Patent Applications Published Under Second Trial Voluntary Protest Program	PI 49
Indices of Reissues, Plants and Designs	PI 57
Classification of	
Patents (Including Reissues)	PI 61
Designs and Plants	PI 64
Geographical Index of Residence of Inventors	
Patents (Including Reissues)	PI 65
Designs and Plants	PI 67

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PATENT AND TRADEMARK OFFICE NOTICES

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

3,245,280, Re. S.N. 775,252, Filed Mar. 7, 1977, Cl. 74/462, INTEGRAL GEAR, George M. Mooney, Owner of Record: *Inventor,* Attorney or Agent: Richard O. Bartz, Ex. Gp.: 345

3,642,829, Re. S.N. 808,358, Filed June 20, 1977, Cl. 260/346.8, CONTINUOUS PROCESS FOR THE PREPARATION OF MALEIC ANHYDRIDE FROM AN AQUEOUS SOLUTION OF MALEIC ACID BY DISTILLATION, Ernest Weyens, Owner of Record: *UCB Societe Anonyme, Saint-Gilles-lez-Brussels, Belgium,* Attorney or Agent: John E. Lind, et al., Ex. Gp.: 121

3,711,166, Re. S.N. 808,410, Filed June 20, 1977, Cl. 308/3, MEANS FOR CONTROLLING THE COEFFICIENT OF FRICTION BETWEEN BEARING SURFACES, Andrew J. Wayson, Owner of Record: *Litton Industrial Products, Inc., Hingham, Mass.,* Attorney or Agent: Joseph R. Spalla, et al., Ex. Gp.: 316

3,751,399, Re. S.N. 806,991, Filed June 16, 1977, Cl. 260/47 UA, POLYACRYLATE RESIN COMPOSITIONS, Henry L. Lee, Jr., et al., Owner of Record: *Lee Pharmaceuticals, South El Monte, Calif.,* Attorney or Agent: Edward S. Irons, et al., Ex. Gp.: 143

3,891,233, Re. S.N. 808,489, Filed June 21, 1977, Cl. 277/32, INFLATOR SEAL, William H. Damon, Owner of Record: *Allied Chemical Corporation, New York, N.Y.,* Attorney or Agent: Patrick L. Henry, et al., Ex. Gp.: 243

3,904,671, Re. S.N. 808,280, Filed June 20, 1977, Cl. 260/473 R, ESTERS OF 3-(HYDROXY OR HYDROXYMETHYL)-4-HYDROXYPHENYL AMINOMETHYL KETONES, Hiroaki Minatoya, et al., Owner of Record: *Sterling Drug Inc., New York, N.Y.,* Attorney or Agent: B. Woodrow Wyatt, et al., Ex. Gp.: 127

3,990,926, Re. S.N. 808,331, Filed June 20, 1977, Cl. 156/3, METHOD FOR THE PRODUCTION OF MATERIAL FOR PRINTED CIRCUITS, Jiri K. Konicek, Owner of Record: *Perstorp AB, Perstorp, Sweden,* Attorney or Agent: Davidson C. Miller, et al., Ex. Gp.: 161

PATENT NOTICES

Certificates of Correction for the Week of Aug. 9, 1977

Re. 29,023	3,998,147	4,015,925	4,021,399
Re. 29,145	3,998,606	4,015,991	4,021,443
D. 244,470	4,000,133	4,016,189	4,021,586
3,749,800	4,000,172	4,016,332	4,021,605
3,752,773	4,001,333	4,016,353	4,021,832
3,804,880	4,001,371	4,016,401	4,021,849
3,852,465	4,001,408	4,016,404	4,021,996
3,862,142	4,001,606	4,016,421	4,022,037
3,865,807	4,002,535	4,016,529	4,022,511
3,880,182	4,003,296	4,016,643	4,022,553
3,907,932	4,003,613	4,016,732	4,022,674
3,919,287	4,003,894	4,016,771	4,022,735
3,928,347	4,004,226	4,017,277	4,022,856
3,932,736	4,004,916	4,017,362	4,022,900
3,935,735	4,005,028	4,017,378	4,022,987
3,936,414	4,005,358	4,017,410	4,023,068
3,951,946	4,005,683	4,017,480	4,023,165
3,953,432	4,005,828	4,017,557	4,023,203
3,958,211	4,006,089	4,017,947	4,023,515
3,959,379	4,008,512	4,018,129	4,023,630
3,960,954	4,008,961	4,018,159	4,024,044
3,966,914	4,009,362	4,018,167	4,024,077
3,966,935	4,009,627	4,018,688	4,024,173
3,967,761	4,011,558	4,018,690	4,024,174
3,969,146	4,011,962	4,019,114	4,024,311
3,981,736	4,012,311	4,019,205	4,024,340
3,984,667	4,012,404	4,019,241	4,024,364
3,985,874	4,012,635	4,019,743	4,024,369
3,986,940	4,012,975	4,019,781	4,024,377
3,988,092	4,013,130	4,019,862	4,024,463
3,988,904	4,013,178	4,019,885	4,024,491
3,989,893	4,013,551	4,019,931	4,024,671
3,991,916	4,013,662	4,020,163	4,024,761
3,992,551	4,013,973	4,020,279	4,025,090
3,992,643	4,014,087	4,020,695	4,025,252
3,993,174	4,014,141	4,020,697	4,025,722
3,993,733	4,014,665	4,020,711	4,025,855
3,995,300	4,015,350	4,020,812	4,026,202
3,996,851	4,015,509	4,020,937	4,026,757
3,997,501	4,015,525	4,021,095	
3,997,526	4,015,669	4,021,152	
3,997,818	4,015,902	4,021,387	

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF JULY 2, 1977

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	8-23-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	9-3-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	6-1-76
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	9-23-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	1-19-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	4-8-76
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	4-28-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	6-14-76
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	1-12-77
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	6-2-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	11-17-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	6-14-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	9-29-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	12-6-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	4-14-70
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors: Miscellaneous Hardware; Locks; Building Structures: Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	11-24-76

Expiration of patents: The patents within the range of numbers indicated below expire during July 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,943,327 to 2,947,000, inclusive
Plant Patents..... Numbers 1,957 to 1,962, inclusive

REISSUES

AUGUST 9, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,342
BUCKLE FOR RETARDED AUTOMATIC UNLOCKING OF SAFETY BELTS AND HARNESSES OF PARACHUTING EQUIPMENT AND OF VEHICLES

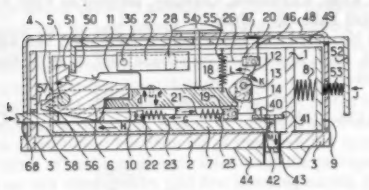
Guy Barbe, Marseille, France, assignor to Etudes et Fabrications Aeronautiques, Paris, France

Original No. 3,952,381, dated Apr. 27, 1976, Ser. No. 507,874, Sept. 20, 1974. Application for reissue June 17, 1976, Ser. No. 697,012

Claims priority, application France, Sept. 21, 1973, 73.34955

Int. Cl.[2] B64D *17/38*

U.S. Cl. 24—230 A 16 Claims



1. A buckle for retarded automatic unlocking the shackle of safety belts and harnesses, said buckle comprising:

a casing for receiving the shackle;

a frame means slideably mounted with respect to said casing and including a frame means return spring connected to said casing for biasing said frame means to an initial position;

a shaft mounted through said frame means;

a bolt rotatably mounted on said shaft for releasably engaging and locking the shackle;

an automatic unlocking control rotatably mounted on said shaft and engaging said bolt for disengaging said bolt from the shackle for unlocking the shackle from said bolt;

an auxiliary locking means including a movable meand supported by said frame means and releasably engaging and locking said automatic unlocking control so as to block rotation of said control to prevent unlocking the shackle from said bolt;

at least one drive spring, connected to said movable means, compressed by the shackle when the shackle is inserted into said casing and biasing said movable means for movement out of engagement with said automatic unlocking control for unlocking said automatic unlocking control

said auxiliary locking means further including a movable latch means withdrawably abutting said movable means for securing said movable means against the biasing of said drive spring and a brake means connected to said movable means for retarding rapid acceleration of said movable means under the urging of said drive spring when said movable latch means is withdrawn from abutting said movable means;

whereby said automatic unlocking control is slowly unlocked under the action of a traction force exerted by the shackle on said bolt, which traction force is sufficient to slideably move said frame means against the bias of said frame means return spring, said frame means return spring returning said frame means to its initial position as soon as the traction force of the shackle on said bolt substantially diminishes.

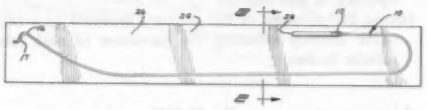
Re. 29,343
METHOD FOR FORMING AND STERILIZING CATHETERS

Kurt Amplatz, 10 Evergreen Road, St. Paul, Minn. 55110

Original No. 3,839,841, dated Oct. 8, 1974, Ser. No. 271,586, July 13, 1972. Application for reissue Feb. 20, 1976, Ser. No. 659,646

Int. Cl.[2] B65B *55/18*

U.S. Cl. 53—21 FC 6 Claims



5. A method of preparing and preserving in readiness for use a catheter for use within the human body, said catheter comprising an elongated strip of thermoplastic material having a temperature above which it is free forming and below which it tends to retain its shape, the method including the steps of:

1. preparing a forming board having a groove of shape to support a catheter in a predetermined desired configuration;

2. supporting a catheter in said predetermined desired configuration;

3. heating the catheter at least to the free form temperature of the catheter materials;

4. reducing the temperature of the catheter to substantially below the free form temperature;

5. supporting the catheter in said groove of said forming board to constitute a forming board catheter unit;

6. encompassing the forming board-elongated catheter unit in a hermetically sealed envelope;

7. sterilizing the interior of the envelope and the contents thereof; and

8. retaining the catheter in the forming board and in the envelope until it is ready to be used.

Re. 29,344
METHOD AND APPARATUS FOR MANUFACTURING TUBES OR TUBULAR BODIES WITH INNER WALLS HAVING CROSS SECTIONS OF IRREGULAR SHAPES

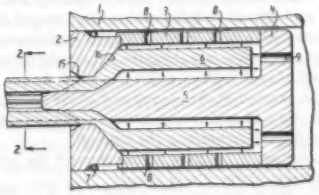
Yoshihiro Yamaguchi, Ashiya; Tomiharu Matsushita, Nishinomiya; Masataka Noguchi, Kobe; Junichi Nakagawa, Hatano, and Hakumi Hasegawa, Akashi, all of Japan, assignors to Kobe Steel, Ltd., Kobe, Japan

Original No. 3,808,860, dated May 7, 1974, Ser. No. 281,041, Aug. 16, 1972. Application for reissue May 7, 1976, Ser. No. 684,234

Claims priority, application Japan, Aug. 18, 1971, 46-63129

Int. Cl.[2] B21C *25/08, 23/04*

U.S. Cl. 72—60 3 Claims



1. A method of manufacturing tubes or tubular bodies with

inner walls having cross-sections of irregular shapes by means of hydrostatic extrusion, comprising the steps of:

placing a tubular billet having a pre-shaped, tapered tip portion against a die in a pressure chamber with a mandrel positioned in an axially extending hole of said billet, said mandrel having a conical tip portion and a grooved portion, said conical tip portion of said mandrel being so shaped as to be similar to a corresponding, conically shaped inlet hole of said [die] *billet;*

introducing a pressure medium under pressure into said chamber so as to advance said mandrel toward the inner end surface of said billet, such that the conically shaped tip portion and the grooved portion of the mandrel may provide complete sealing between the inner surface of said billet and the tip portion of said mandrel and between the outer surface of said billet and the inner wall of the inlet opening of said die; and

raising the pressure of the pressure medium to a required value thereby effecting the extrusion of said tubes or tubular bodies.

Re. 29,345

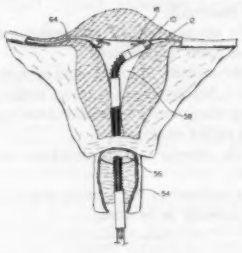
METHOD AND APPARATUS FOR NON-SURGICAL, REVERSIBLE STERILIZATION OF FEMALES

Robert A. Erb, Valley Forge, Pa., assignor to The Franklin Institute, Philadelphia, Pa.

Original No. 3,805,767, dated Apr. 23, 1974, Ser. No. 335,816, Feb. 26, 1973. Application for reissue Apr. 22, 1976, Ser. No. 679,185

Int. Cl.[2] A61B *19/00*

U.S. Cl. 128—1 R **29 Claims**



10. Apparatus for forming an oviduct block comprising: a tubular means having a length sufficient to extend from the vagina area of a female to the uterine end of the oviduct and having a diameter sufficiently small to pass longitudinally through the cervix of said female; said tubular means having first and second terminal ends; said first terminal end having means to engage and connect a tip member thereto, said tubular means including means therein for adjustably displacing said first terminal end laterally relative to said second terminal end to position said first terminal end adjacent the uterine end of said oviduct to cause the tip member to at least temporarily block said uterine end; said tubular means further including fluid passage means for transmission of a plastic material from a point adjacent to the second terminal end into said oviduct beyond said tip member at first terminal end of said tubular means, and means to dispense a sufficient amount of said material to fill a predetermined length of the oviduct and to flow into engagement with the tip member at the uterine end of said oviduct, to form a block having an enlarged end portion exposed in the uterine end of the oviduct.

28. The method of forming non-surgically removable oviduct block in a female, comprising the steps of:

a. introducing an injecting means through the cervical os into the uterine cavity of said female;

b. positioning the injecting means adjacent the uterine end of the oviduct and providing a seal with the uterine wall in the marginal area circumscribing the interior of the oviduct limiting the flow into the uterine cavity of material dispensed by the injecting means;

c. injecting from said injecting means into the interior of said oviduct beyond said seal a plastic material which will flow into engagement with said seal, said plastic material being injected into said oviduct in an amount sufficient to block the passage of ovum through said oviduct to the uterine cavity; and

d. allowing said plastic material to solidify in said oviduct and provide an oviduct block at least partially formed by said solidified plastic material, whereby the block can be gripped by mechanical means to remove the oviduct block non-surgically.

Re. 29,346

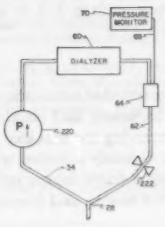
SINGLE NEEDLE DIALYSIS

Klaus F. Kopp, Kirchseeon, Germany, assignor to Vital Assists, Inc., Salt Lake City, Utah

Original No. 3,756,234, dated Sept. 4, 1973, Ser. No. 149,905, June 4, 1971. Application for reissue Sept. 3, 1975, Ser. No. 610,043

Int. Cl.[2] A61M *5/00, 1/03*

U.S. Cl. 128—214 R **4 Claims**



3. A method of dialyzing the blood of a patient with a single cannulation in a system including a pump and a hemodialyzer connected together in a series configuration, and a single hollow cannula having a bifurcated conduit connected thereto to provide an arterial branch and a venous branch, coupled respectively to opposed ends of the series connected pump and hemodialyzer, wherein the interconnected conduit, pump and hemodialyzer define a closed system connected to the single hollow cannula, comprising the steps of:

cannulating the blood vessel of a patient with the single cannula through which blood is withdrawn from and returned to the patient through said system in alternate phases of successive cycles of operation;

pumping blood from the patient to the hemodialyzer through the arterial branch, while preventing the return of blood to the patient through the venous branch;

sensing pressure in the closed system;

automatically occluding blood flow through the arterial branch to stop the withdrawal of blood from the patient in response to the sensing of a predetermined first pressure level in the closed system, while permitting the return of blood to the patient through the venous branch; and, alternately,

automatically occluding blood flow through the venous branch to stop the return flow of blood to the patient in response to the sensing of a predetermined second pressure level in the closed system, while permitting blood withdrawal from the patient through the arterial branch, so that blood is alternately withdrawn and returned to the patient in alternate phases of each successive cycle of operation of the system in response to the sensing of the predetermined first and second pressure levels.

Re. 29,347

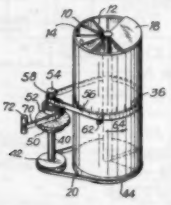
MEASURING AND DISPENSING APPARATUS

Louis T. Friedman, 2 Leonard St., Farmingdale, N.Y. 11735

Original No. 3,893,592, dated July 8, 1975, Ser. No. 410,420, Oct. 29, 1973. Application for reissue Mar. 12, 1976, Ser. No. 666,457

Int. Cl.[2] B67D *5/30*

U.S. Cl. 222—14 19 Claims



1. Apparatus comprising a source of flowable material, passage means having a sequence of parallel passages adapted for being fed by said source, said passages having inlets and outlets, first blocking means displaceable to obturate selected of said inlets whereby to prevent feeding of the associated passages from said source while the remainder of said inlets are open so that the corresponding passages can be fed from said source, second blocking means to obturate selected of said outlets constituting less than all of the same but including at least those of said outlets associated with the passages whose inlets are not obturated by said first blocking means, and drive means for the concomitant driving of said first and second blocking means to displace the same relative to said sequence of passages whereby said material can flow into selected passages and out of selected passages but is prevented from flowing from said source directly through any of the passages; said drive means including control means displaceable through distances corresponding to selectable numbers of said passages, storage means to store energy corresponding to the displacement of said control means, coupling means effective on release of said control means and responsive to said storage means to drive the first and second blocking means across said inlets and outlets to release material from the selected number of passages and to permit the recharging of the passages from said source, and scale means cooperatively related to said control means whereby displacement of said control means can be related to selectable amounts of said material, said control means including a drive mechanism, means for manually displacing said drive mechanism, a shaft driven by said drive mechanism, and a spring loading said shaft to return the same to a normal position of rest.

Re. 29,348

SPARE TIRE EXTRACTION DEVICE

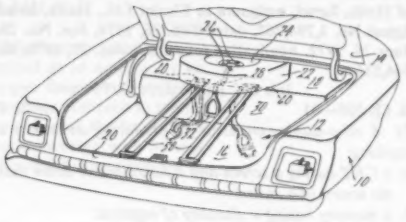
John A. Bott, 931 Lakeshore Drive, Grosse Pointe Shores, Mich. 48236

Original No. 3,940,041, dated Feb. 24, 1976, Ser. No. 360,094, May 14, 1973. Application for reissue Sept. 23, 1976, Ser. No. 725,987

Int. Cl.[2] B62D *43/00*

U.S. Cl. 224—42.12 3 Claims

1. In combination, an [automobile body] *automotive vehicle* having a longitudinal axis and an interior storage area, a [raised] *generally upstanding* wall along an access side of said storage area, said wall extending generally perpendicular to said axis and transversely of said [automobile body] *vehicle*, a spare tire assembly including a tire and wheel, means in said storage area supporting said assembly in a substantially horizontal attitude and substantially parallel to said axis, said wheel having a plurality of [bolt] holes *formed* therein, said [bolt] holes being defined by a plurality of axes arranged generally parallel to said wall, and a flexible strap having a length equal to at least the radial distance between said [bolt] holes and the outer periphery of said assembly and having a handle at one end thereof and a fastening element at its opposite end, said fastening element extending generally parallel to said wall *and extending axially through* and [engaged with one of said bolt holes] *cooperative with one of the holes for securing said opposite end of said strap to said assembly*, said strap having a main body portion arranged substantially parallel to said [automobile body] *vehicle* axis and extending radially of said assembly along the underside thereof from said one [bolt] hole to a



position where said handle may be conveniently grasped by a person reaching [over said wall] into said storage area, whereupon said strap may be pulled *in a direction causing said fastening element to move* toward said wall by the said person [to] *and thereby* cause said assembly to be biased [rearwardly and upwardly of said storage area, whereby the rearwardly facing portion of said assembly is moved upwardly and rearwardly so that said assembly passes up and over said wall] *longitudinally of the vehicle and out of said storage area.*

Re. 29,349

ORGANIC THERMOTROPIC NEMATIC COMPOUNDS

Elwood L. Strebel, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing, St. Paul, Minn.

Original No. 3,829,491, dated Aug. 13, 1974, Ser. No. 363,429, May 24, 1973. Continuation-in-part of Ser. No. 817,143, April 17, 1969, abandoned. Application for reissue Sept. 2, 1975, Ser. No. 609,515

Int. Cl.[2] C07D *119/00*

U.S. Cl. 260—566 F 8 Claims

1. N-(p-methoxybenzylidene)-p-n-butyl aniline.

Re. 29,350

PROCESS FOR CHLORINATING ETHYLENE POLYMERS

Lowhardt A. A. Schoen, Spaubeek, Netherlands, assignor to Stamicarbon, B.V., Geleen, Netherlands

Original No. 3,935,181, dated Jan. 27, 1976, Ser. No. 500,942, Aug. 27, 1974. Application for reissue June 8, 1976, Ser. No. 693,953

Int. Cl.[2] C08F *27/03*

U.S. Cl. 526—45 15 Claims

1. Process for chlorinating a solid, finely divided ethylene polymer to produce statistical or hybridical chloropolyethylene, said process comprising

a. mixing said polymer with 10 to 100% by weight of water, based on the weight of ethylene polymer, and

b. chlorinating the polymer with gaseous chlorine at a temperature which is below the ethylene polymer decomposition temperature and above the crystalline melting point of the ethylene polymer during [at least about 70%] *a part* of the chlorination period and at a pressure such that the boiling point of water at said pressure is at least equal to the said chlorination temperature while maintaining the amount of water in the ethylene polymer at a level of at least 10% by weight, based on the weight of starting ethylene polymer, until the chlorination has proceeded to a polymer chlorine content of at least 15% by weight and

maintaining the water substantially uniformly distributed in the polymer.

Re. 29,351

VIDEO-DISPLAY-PROCESSOR

Yoram Zukerman; Moshe Ben-Porath, and Benjamin Sabbah, all of Haifa, Israel, assignors to Elscint Ltd., Haifa, Israel

Original No. 3,794,762, dated Feb. 26, 1974, Ser. No. 266,128, June 26, 1972. Application for reissue Jan. 27, 1975, Ser. No. 544,516

Int. Cl.[2] **H04N** *3/04, 5/76*

U.S. Cl. 358—81 **22 Claims**

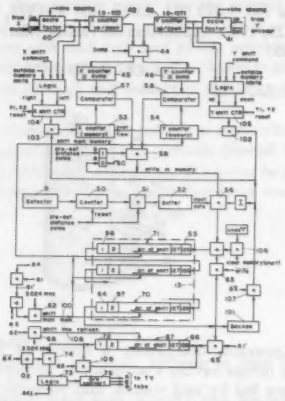
21. A video-display-processor for producing an on-line display comprising:

a. a CRT having a screen and a modulatable beam that scans the screen in a raster;

b. a memory having a plurality of registers;

c. means to sequentially read-out the contents of the registers, non-destructively, in synchronism with the scan of the screen, for modulating the beam in accordance with the contents of the registers; and

d. detector means responsive to radiation stimuli emitted by a



radiation field for storing data in the memory during the time the contents of the registers are being sequentially read-out.

PLANT PATENTS

GRANTED AUGUST 9, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,090

DISTINCT VARIETY OF PHILODENDRON PLANT

Robert H. McColley, P.O. Box 17126, Orlando, Fla. 32810

Filed Oct. 4, 1976, Ser. No. 729,583

Int. Cl.[2] A01H *5/12*

U.S. Cl. Plt.—88 **1 Claim**

1. A new and distinct variety of Philodendron plant substantially as herein disclosed, characterized as to novelty by its superior growth, resistance to shot-gun fungus and bacterial soft rot, glossy bronze red and green color contrasts in immature and mature leaves, the hastate shape of the leaves, the glossy bronze red color of the sheath covering with its tendency to curl back and hang on to the stem for long periods of time.

PATENTS

GRANTED AUGUST 9, 1977

ERRATA

For CLASS	See PATENT NO.
248–493	4,040,149
432–124	4,040,203
052–664	4,040,231
052–720	4,040,232
062–037	4,040,259
429–014	4,040,435
209–166	4,040,519
239–049	4,040,564
272–133	4,040,627
331–055	4,040,728
425–218	4,040,734
028–271	4,040,782
055–257 R	4,040,824
208–008	4,040,941
542–400	4,041,027
544–012	4,041,028
544–025	4,041,029
544–117	4,041,030
264–250	4,041,031
548–302	4,041,045
548–375	4,041,046
560–121	4,041,064
195–103.5 A	4,041,147
264–060	4,041,195
178–068	4,041,239
343–005 R	4,041,341
361–014	4,041,356
361–006	4,041,357
361–365	4,041,358
361–433	4,041,359
363–015	4,041,364
363–061	4,041,366
363–097	4,041,367
364–900	4,041,460
364–200	4,041,461
364–200	4,041,462
364–900	4,041,463
364–200	4,041,464
364–900	4,041,465
364–900	4,041,466
364–900	4,041,467
364–900	4,041,468
364–900	4,041,469
364–900	4,041,470
364–200	4,041,471
364–900	4,041,472
364–900	4,041,473
337–295	4,041,525

PATENTS

GRANTED AUGUST 9, 1977

NOTE—A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this Issue. These entries will be in numerical order by document publication number.

GENERAL AND MECHANICAL

4,040,123

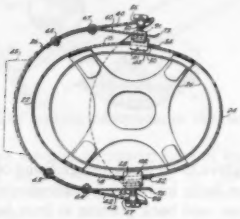
DETACHABLE CONNECTION FOR PIVOTALLY MOUNTING A FACE SHIELD TO A HEAD PROTECTOR

Garland S. Williams, 5790 Devonshire Blvd., Miami, Fla. 33155

Filed May 27, 1976, Ser. No. 690,393

Int. Cl.[2] A61F *9/06*

U.S. Cl. 2—10 **5 Claims**



1. In combination, (a) a rigid head protective helmet, (b) a face shield, and (c) a connector means for pivotally and removably connecting and orienting the face shield onto the head protective helmet,

A. said helmet being of the type having a crown and a downwardly extending skirt with a front, rear and opposing size zones, and said side zones terminating at a rim at a level above the ears of a wearer's head, said helmet having an elongate opening in each side zone in confronting relation and adjacent the rim,

B. said face shield having an inner surface and an outer surface and including a front face with a central window means and a rearwardly extending left and right side face each terminating at a generally vertical edge and each side face having a hole of predetermined size adjacent the edge and with their centers defining a line above the central window means,

C. said connector means comprising:

a. a first and a second elongate leaf spring each having a first end zone and a second end zone,

said first end zone of said first spring being secured to the inner surface of said face shield and said second end zones normally diverging from the adjacent inner surface of the right side face and being of a length to extend beyond the line through the centers of the holes in said side faces, and said second end zone terminating at a terminal end, and said terminal end being accessible at said edge of said right side face, and said second end zone having a hole of a predetermined size smaller than the predetermined size of said hole in said right side face,

said first end zone of said second leaf spring being secured to the inner surface of said face shield and said second end zone normally diverging from the adjacent inner surface of said left side face and being of a length to extend beyond the line through the centers of the holes in said side faces and said second end zone terminating at a terminal end, and said terminal end being accessible at said edge of said left side face, and said second end zone having a hole of a predetermined size smaller than the predetermined size of said hole in said left side face,

said holes in said second end zones being aligned with one another and normally within the space comprising a projection of the holes in the side faces of the shield and said second end zones normally converging toward one another;

said first and second leaf springs being yieldable to a compressive force to move their respective terminal ends toward the inner surface of the right and left side faces respectively of the shield with the holes in each of the second end zones remaining at all times substantially in said projection during relative movement of the leaf springs toward the adjacent inner surface of the face shield,

b. a first and a second pivot pin each having a headed inner end and a shank terminating at a threaded outer end, and each pin being of a diameter less than that of the holes in said side faces of said shield,

c. a key means on each pivot pin to constrain the shield to pivotal movement only with respect to the hat while connected thereto, each of said key means comprising a first leg having an inner surface and an outer surface with a hole receiving one of said pivot means and with the inner surface of said first leg in abutting engagement with the adjacent headed inner end; and a second leg extending inwardly from said inner surface to a terminal end, said terminal end of said key means of said first pivot pin being sized and normally extending into the opening in the right side face in a keyed condition, and said terminal end of said key means on said second pivot pin being sized and normally extending into the opening in the left side face in a keyed connection,

d. means journaling said leaf springs on the shanks of said pivot pins comprising, the shank of said first pivot pin extending through the hole of said first elongate leaf spring and the shank of said second pivot pin extending through the hole of said second elongate leaf spring, said leaf springs normally urging said terminal ends of said second legs into keyed relation in said openings of said helmet, and

e. a first keeper exteriorly of said face shield and in abutting engagement with the other surface of said face shield about said hole in the right side face and including an inner sleeve length of a diameter less than that of the hole in said right side face of said shield and having a threaded axial recess in threaded engagement on the threaded end of the first pivot pin, and a first coil spring having an inner end and an outer end about the shank of said first pivot pin and a first pair of washers on the shank of said first pivot pin comprising an inner washer and an outer washer, said inner washer being captivated between the leaf spring and the inner surface of the first leg of the associated key means and said outer washer being captivated between said inner end of said coil spring and said leaf spring, and

f. a second keeper exteriorly of said face shield and in abutting engagement with the outer surface of said face shield about said hole in the left side face and including an inner sleeve length of a diameter less than that of the hole in said left side face of said shield and having a threaded axial recess in threaded engagement on the threaded end of the second pivot pin, a second coil spring having an inner end and an outer end about the shank of said second pivot pin and a second pair of washers on the shank of said second pivot pin comprising an inner washer and an outer washer, said inner washer being captivated between the leaf spring and the inner surface of the first leg of the associated key means and said outer washer being captivated between said inner end of said coil spring and said leaf spring.

4,040,124
HOSPITAL GOWN HAVING FITTING MEANS

Richard L. Zoephel, Lake Villa, Ill., assignor to The Kendall Company, Boston, Mass.

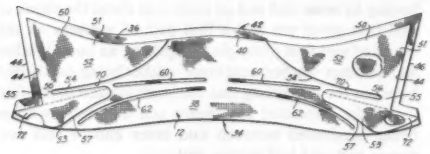
Division of Ser. No. 473,017, May 24, 1974, Pat. No. 3,921,221.
This application Sept. 15, 1975, Ser. No. 612,422
The portion of the term of this patent subsequent to Nov. 25, 1992, has been disclaimed.
Int. Cl.[2] A41D *13/00*
U.S. Cl. 2—51 2 Claims

1. A hospital gown comprising, a garment having a front, a back, and first and second margins defining an opening for placement of the garment on a wearer, a belt having first and second ends and having a sufficient length to encircle the garment, and a cohesive-adhesive material on both of said belt ends for releasably attaching the belt ends together with said belt passing around the garment margins to close the garment about the wearer, at least one of said belt ends having cohesive-adhesive material on both of its opposed sides, said garment including a region of cohesive-adhesive material on the outside of the gown and located to releasably attach at least one of said belt ends to the gown when said belt closes the garment.

4,040,125
CONVERTIBLE SHIRT COLLAR

Sidney D. Blue, 605 Park Ave., New York, N.Y. 10021

Filed May 20, 1976, Ser. No. 688,391
Int. Cl.[2] A41B *3/04*
U.S. Cl. 2—139 6 Claims

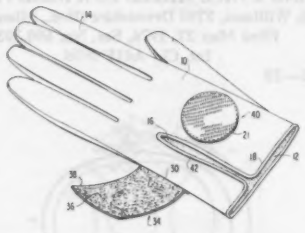


1. A collar for attachment to the neck opening of a shirt body of the type having front body panels with central overlapping vertical edges, the collar including a first outer cape portion and a neckband portion and a second cape portion and neckband portion on the underside of the collar, a multi-ply interlining disposed and secured between the outer and under cape and neckband portions, a first pair of upper slots through one ply of the lining extending laterally outwardly from spaced points at the back of the collar along a line demarking the collar cape from the neckband, the outer ends of the first pair of slots being spaced from the ends of the collar, a second pair of slots through the same ply of the collar interlining extending outwardly similarly spaced from points at the back of the collar, said second pair of slots extending laterally of the collar and curving downwardly across the neckband terminating short of the bottom of the neckband and at a lateral distance beyond the outer ends of the first pair of slots.

4,040,126
GOLF GLOVE

Leonard Cecil, 5644 Bent Branch Road, Bethesda, Md. 20016

Filed Nov. 9, 1976, Ser. No. 740,140
Int. Cl.[2] A41D *19/00*
U.S. Cl. 2—161 A 7 Claims

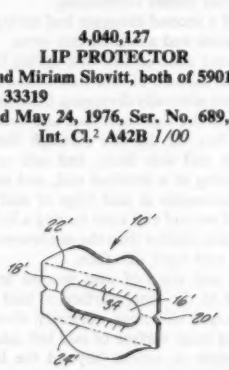


1. In a sports glove to facilitate the gripping of a golf club for example, a glove body including interconnected palm, finger and back portions, said back portion at least being comprised of substantially inelastic and non-resilient material such as leather and having a longitudinal opening extending forwardly from the rear edge of the back portion, the improvement comprising: a one piece integrally formed stretch fastener element attached to said glove body on one side of said opening and being in and of itself elastically extensible and stretchable across said opening, and a complementary fastener element fixed on said back portion on the other side of said opening and adapted to be engaged with said stretch fastener element with the latter elastically tensioned across said opening.

4,040,127
LIP PROTECTOR

Simon Slovitt, and Miriam Slovitt, both of 5901 NW. 61st Ave., Tamarac, Fla. 33319

Filed May 24, 1976, Ser. No. 689,357
Int. Cl.[2] A42B *1/00*
U.S. Cl. 2—174 9 Claims

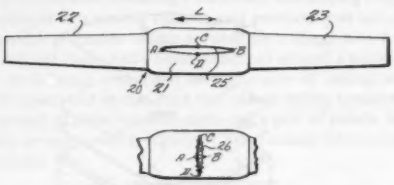


1. A lip protector comprising a
one-piece member of flexible material folded into a substantially V-shaped configuration including
a pair of legs adapted to be inserted in the mouth of the user, said legs including an opening therethrough,
a plurality of tabs bent from the material about said opening, said tabs adapted to be inserted between adjacent lateral surfaces of the teeth of each individual jaw of the user; and
a laterally extending flange connected to each leg adapted to cover the lips of the user when the legs are inserted in the mouth.

4,040,128
ONE-PIECE PANTYHOSE CONSTRUCTION

Walter H. Imboden, Burlington, N.C., assignor to Burlington Industries, Inc., Greensboro, N.C.

Filed Apr. 5, 1976, Ser. No. 673,997
Int. Cl.[2] A41B 9/04
U.S. Cl. 2—409 25 Claims



1. A method of making pantyhose or the like comprising the steps of

a. forming an integral elongated tube of knit fabric, a waist slit being formed in said tube in the middle portion thereof, said slit extending in the dimension of elongation of said tube,

b. forming a crotch slit in the middle portion of said tube in the area thereof generally opposite said waist slit, said crotch slit generally extending in the dimension of elongation of said tube, and said crotch slit having two terminating end points,

c. moving said crotch slit terminating end points toward each other so that the orientation of said crotch slit is changed from one generally extending in the dimension of elongation of said tube to one having a different orientation, said crotch slit assuming a translocated position,

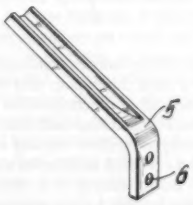
d. closing said tube in the area of said crotch slit while said crotch slit is in said translocated position, so that no slit remains in said tube middle portion generally opposite said waist slit, and

e. providing a waistband or the like in said waist slit.

4,040,129
SURGICAL IMPLANT AND ALLOY FOR USE IN MAKING AN IMPLANT

Samuel G. Steinemann, St-Sulpice, and Stephan M. Perren, Davos, both of Switzerland, assignors to Institut Dr. Ing. Reinhard Straumann AG, Switzerland

Continuation-in-part of Ser. No. 382,194, July 24, 1973, abandoned, which is a continuation-in-part of Ser. No. 162,269, July 13, 1971, abandoned. This application Feb. 24, 1975, Ser. No. 552,216
Claims priority, application Switzerland, July 15, 1970, 10721/70
Int. Cl.[2] A61F 1/24; A61B 17/18; C22C 14/00, 11/00
U.S. Cl. 3—1.9 18 Claims



1. Implant for bone, joint or dental surgery consisting essentially of a worked and heat-treated alloy composition having full tissue compatibility and a tensile strength of not less than about 100 kg/mm^2 and fatigue strength of at least about 40 kg/mm^2, said alloy composition consisting essentially of:

i. a first component constituting about 3% to about 30% by weight of said alloy composition, said first component consisting essentially of not less than one member selected from the group consisting of niobium, tantalum, chromium, molybdenum, aluminum; and the balance

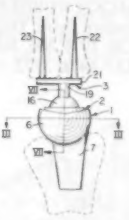
ii. a second component of said alloy composition consisting essentially of not less than one member selected from the group consisting of titanium and zirconium;

wherein the sum of the weights of chromium, molybdenum, and aluminum in said alloy composition amounts to at least 20% by weight of said alloy composition, and the weight of zirconium therein amounts to not more than 75% by weight of said alloy composition; said alloy composition being free from copper, cobalt, nickel, vanadium and tin, apart from the usual impurities.

4,040,130
WRIST JOINT PROSTHESIS

George R. Laure, Kalamazoo, Mich., assignor to Laure Prosthetics, Inc., Portage, Mich.

Filed Oct. 12, 1976, Ser. No. 731,795
Int. Cl.[2] A61F 1/24
U.S. Cl. 3—1.91 9 Claims



1. An endoprosthetic joint for a wrist comprising:

means defining a first, or wrist, member including a socket and having also a prong projecting therefrom, an intermediate member related to the socket of said first member for pivotal motion with respect thereto in only a first plane and a second, or finger, member related to said intermediate member for pivotal motion with respect thereto in only a second plane, said first being at a substantially right angle with respect to said second plane and means associated with said finger member for connecting same to finger bones.

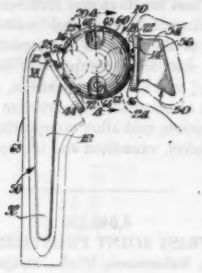
4,040,131
TRISPHERICAL PROSTHETIC SHOULDER DEVICE

Anthony G. Gristina, Winston-Salem, N.C., assignor to Howmedica, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 681,805, April 29, 1976, Pat. No. 4,003,095. This application Jan. 7, 1977, Ser. No. 757,559
Int. Cl.[2] A61F 1/24
U.S. Cl. 3—1.91 6 Claims

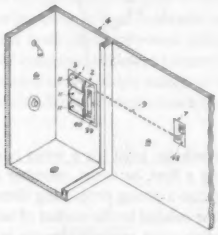
1. A trispherical prosthetic shoulder device comprising a relatively small ball-headed humeral component of a biocompatible metal, a humeral stem on the ball-headed humeral component for affixing it to the intermedullary canal of the humerus, a humeral flange separating the ball-headed component from the stem, a ball-headed scapular component of a biocompatible metal, a scapular stem on the scapular component for attaching it to the scapular region of the shoulder, a scapular flange separating the scapular ball from the scapular stem, a spheroidal ball-capturing member having a pair of spherical sockets disposed substantially 180° from each other, the ball-capturing member comprising a pair of biocompatible cutout plastic hemispheres sharing the sockets between them, clamping means joining the hemispheres together whereby the ball heads are rotatably trapped in the sockets to provide a substantially stable shoulder prosthesis with a substantially

wide range of movement, and the clamping means comprising a pair of metal shells substantially surrounding and enclosing



the hemispheres and fastening means joining the metal shells together.

4,040,132
BACKSCRUBBER
George Braun, 471 Lakeshire Drive, Daly City, Calif. 94015
Filed Feb. 20, 1976, Ser. No. 659,980
Int. Cl.[2] A47K *3/22, 7/00*
U.S. Cl. 4—158 **8 Claims**



1. In a remotely driven backscrubber device for a bath enclosure, the combination with
a casing open inwardly of the enclosure,
at least one cylindrical scrubber rotatably mounted in said casing and partially projecting into said enclosure,
a closed compartment adjacent said casing,
transmission means in said compartment,
and means to drivingly connect said transmission means to said scrubber for transmitting rotation to said scrubber, of
a motor case mounted remotely from said casing and said closed compartment and entirely outside of said enclosure,
an electric motor drive in said case,
an insulated drive line extended from said electric motor drive into said closed compartment,
insulated means in said closed compartment to couple said drive line to said transmission means to transmit rotation from said remote motor drive to said scrubber

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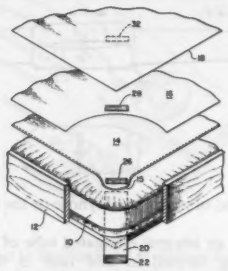
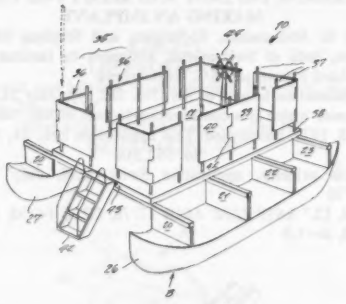
4,040,133
BEDDING ATTACHMENT SYSTEM
Murvin Bruce Gilreath, 4047 Mistral Drive, Huntington Beach, Calif. 92649
Filed June 28, 1976, Ser. No. 700,287
Int. Cl.[2] A47G *9/04*
U.S. Cl. 5—320 **3 Claims**

1. A bedding attachment system for a waterbed comprising:
a mattress substantially filled with liquid;
a frame having a bottom wall and side walls supporting and surrounding said mattress;
a separate bedding attachment strap for each corner of the mattress, each strap having one end portion captured between the bottom wall of the frame and the mattress by the weight of the mattress, each of the strap end portions beneath the mattress extending diagonally approximately toward the opposite corner of the mattress, the length of the strap portion beneath the mattress being long enough such that the weight of the mattress will retain the strap in



position and yet short enough that one person can position the strap by grasping the corner of the mattress and pulling it back from the frame, the other end of said strap extending upwardly between the mattress edge and the surrounding frame; and
bedding attachment means formed on said strap other end for releasable attachment to bedding to be placed on the mattress.

4,040,134
PONTOON BOAT
Alvin Downing, 3939 N. Dayton Lake View Road, New Carlisle, Ohio 45344
Filed Sept. 27, 1976, Ser. No. 727,178
Int. Cl.[2] B63B *7/00*
U.S. Cl. 9—2 F **2 Claims**



1. A pontoon boat, comprising in combination, a rectangular main frame having a deck thereupon, said main frame including a pair of longitudinally telescopic tubes and a plurality of four transverse telescoping tubes, said transverse telescoping tubes being sidewardly extendible beyond a side edge of said main frame, outward extended sections of said transverse telescoping tubes each being secured to a mounting frame, said mounting frame being secured to two pontoons, each of which is made of a standard canoe, and said pontoons consisting of said canoes being filled with a suitable light weight and cellular flotation material, said canoes being covered so as to be watertight and serving as a strong decking, each said outward section of said transverse telescoping tubes being hingedly pivotable, so that said pontoons are pivotable between a position along each side of said main frame and a position upon said deck; a strengthener being insertable into each of said trans-

verse telescoping tubes for bridging said hinge, in order to rigidly lock said outward section thereof to a remainder of said transverse telescoping tube; a pair of wheel assemblies pivotally attached to an underside of said main frame for being upwardly retracted out of the way, or in a downwardly extended position for travel upon a highway, said wheel assemblies in downward extended position being secured by braces; said pontoon boat including a forwardly telescoping tongue for attachment to a towing vehicle, said pontoon boat including a forwardly pivotable ladder secured by a hinge to a forward edge of said deck; and a removeable rail around a periphery of said deck being comprised of a plurality of railing sections spaced apart end to end, each one of said railing sections being comprised of three vertical posts and a pair of panels, both of which are supported pivotally by hinge means from a center of said posts.

4,040,135

EMERGENCY LOCATOR SYSTEM FOR LOCATING AND RETRIEVING SUNKEN VESSELS

Ruben Robert Arnold, 21641 Zamora Lane, Huntington Beach, Calif. 92646

Filed Nov. 20, 1975, Ser. No. 633,922
Int. Cl.[2] B63B *21/52*
U.S. Cl. 9—9 **12 Claims**

1. An Emergency Locator System for locating and retrieving sunken vessels and locating vessels in distress comprising in combination;

a base adapted to be mounted on an external surface of a vessel in spaced apart relationship thereto to permit air and water to flow between a base lower surface and the vessel external surface on which the base is mounted, said base further comprising a hydrostatic pressure sensing float holding and release means, having a pressure sensing flexible diaphragm member mounted on the base lower surface for actuating a float holding and release trigger means, said trigger means adapted to fixedly hold a buoyant marker float means releasably mounted on said base until said base having said float means mounted thereon becomes immersed in a fluid having a pressure greater than a pre-selected pressure below which the said diaphragm will not actuate the said trigger means, said preselected pressure being substantially greater than atmospheric pressures, whereupon said diaphragm actuates said float holding and release trigger means and the float means is released from said base and rises to the water surface, said base having one or more U-shaped grapple cables fixedly connected to a top surface of said base and being adapted further for being fixedly attached at cable ends to the vessel surface;

said buoyant marker float means adapted for releasably mounting on said base in spaced apart relationship for permitting air and water to circulate between base side and top surfaces and a float under side, said underside being adjacent to said base side and top surfaces when said float means is mounted on said base, said float means having a plurality of base float holding trigger means engaging shoulders for engaging said trigger means in releasably locked position when said float means is mounted on said base; and

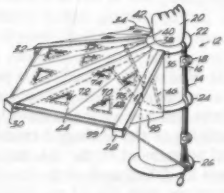
a locator line connecting said float means to said base for maintaining float to base connection when the float means is released from the base and rises to the water surface and for guiding a diver and a retrieving grapple hook means connected to a retrieval cable to the grapple cables for hooking a grapple hook means to said grapple cables.

4,040,136

WING TO SWIM

Onofre S. Garcia, 77 Prospect St., Newark, N.J. 07105

Division of Ser. No. 500,921, Aug. 27, 1974, Pat. No. 3,913,516, which is a continuation-in-part of Ser. No. 409,277, Oct. 24, 1973, abandoned. This application May 9, 1975, Ser. No. 576,046
Int. Cl.[2] A63B *31/00*
U.S. Cl. 9—302 **1 Claim**



1. A device for attachment to a member to be manipulated in water to cause forces of propulsion, said device comprising:

a sleeve having a first end zone and a second end zone and being characterized by a longitudinal centerline,

a plurality of equi-spaced struts each of a common length and each having a first end and a second end,

pivot means connecting the first end of each strut to the first end zone,

said struts being swingable from a first position of general alignment of said struts with said sleeve and a second position of said struts extending radially outwardly and rearwardly toward said second end zone;

stop means to limit swinging movement of the second end of each of said struts toward said first end zone,

said stop means defining said second position,

said second position being such that each of said struts is oriented at a substantially common angle of divergence with respect to the centerline of said sleeve and with the second ends being in a substantially common transverse plane with respect to the sleeve centerline and said second ends defining a curved line in said plane of a substantially common radius from said centerline;

a flexible canopy connected to each of said struts and spanning the space between said struts and said sleeve; and

said sleeve being of an axial length greater than the distance between the first end zone and said transverse plane;

means to connect said sleeve to a member;

said curved line defines a sector of a circle;

said sleeve is of flexible material; and

the device includes tie means to hold the struts in said first position when not in use, said tie means including a draw string connected to said second end zone and to said second end of each strut whereby the second end of each

strut may be pulled toward and secured to the second end zone by said drawn string;

a glove portion on said first end zone and opening into said sleeve; and

said sleeve including circumferential reinforcing zones at spaced locations along the length of said sleeve.

4,040,137

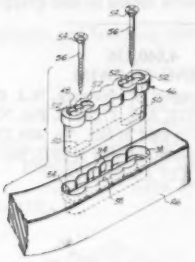
BINDING FOR WATER SKI

William H. Fetherston, Bellevue, and Maurice N. Theriault, Renton, both of Wash., assignors to Composite Structures Corporation, Kent, Wash.

Continuation of Ser. No. 578,732, May 19, 1975, abandoned. This application Aug. 16, 1976, Ser. No. 714,992

Int. Cl.[2] A63C *15/06*

U.S. Cl. 9—310 AA **8 Claims**



1. A water ski binding for a heel of a person's foot, said binding having an essentially U-shaped hold down member for a resilient heel boot and having longitudinally extending elongate slots on each leg of the U-shaped member for mounting with longitudinal adjustment to the ski, the new combination comprising: means for filling each of the longitudinally extending elongated slots on each leg of the U-shaped hold down member comprising an insert having means for mounting the hold down member to the water ski through holes in the inserts.

4,040,138

DRIVE FOR USE IN A SWEEPING DEVICE

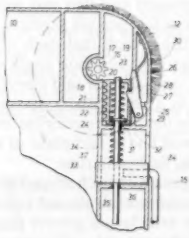
Johannes Liebscher, Nassau, Lahn, Germany, assignor to Leifbeit International Gunter Leifheit GmbH, Nassau, Lahn, Germany

Filed Jan. 13, 1975, Ser. No. 540,822

Claims priority, application Germany, Jan. 15, 1974, 2401685

Int. Cl.[2] A47L *11/32*

U.S. Cl. 15—42 **18 Claims**



1. In a sweeping device of the character described, a combination comprising a housing having a front region; at least one corner-sweeping brush mounted in said front region for rotation about an axis; means for rotating said brush about said axis, including a rotating element connected to said brush, and a translation element formed with a chamber and mounted in said housing for translation between a retracted position and an extended position, and operative for engaging said rotating element and for rotating the latter during said translation; means for actuating said rotating means at least when said front region reaches an obstruction on a surface being swept so that said brush rotates, whereby dirt is removed from the vicinity of said obstruction, said actuation means including an elongated thrust rod mounted in said housing for displacement in a direction coinciding with the translation of said translation element and extending through said chamber, said thrust rod being formed with a projection accommodated in said chamber, and a spring in said chamber surrounding said thrust rod and abutting against said projection and said translation element and urging the latter away from the former longitudinally of said thrust rod and toward said rotating element.

4,040,139

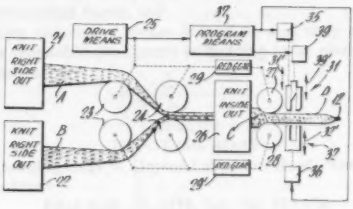
SCOURING PAD OR THE LIKE

George B. Botvin, Cumberland, R.I., assignor to ACS Industries, Inc., Woonsocket, R.I.

Continuation-in-part of Ser. No. 553,509, Feb. 27, 1975. This application June 25, 1975, Ser. No. 590,102

Int. Cl.[2] A47L *17/08*; D04B *21/16*

U.S. Cl. 15—209 B **15 Claims**



2. A scouring pad comprising an axially extending length of loosely knitted pliant outer tubular scouring material, said length being in inside-out orientation, an axially extending length of loosely knitted pliant inner tubular stuffing material within said outer tubular material in face-out orientation and extending to substantially the axial ends of said outer tubular material, said outer material being secured at its ends on compressed generally transverse alignments, thereby retaining closure of both ends of the outer tubular length, in substantial grain-matching relation with the adjacent surface of said inner tubular material.

4,040,140

ICE SCRAPER

Evan Leon Hopkins, Emporia, Kans., and Donald W. Cartner, Kansas City, Mo., assignors to Hopkins Manufacturing Corporation, Emporia, Kans.

Filed May 17, 1976, Ser. No. 687,973

Int. Cl.[2] B60S *1/04*; A47L *17/06*

U.S. Cl. 15—236 R **6 Claims**

1. A scraper for removing ice from a smooth surface, said scraper being adapted to be held in the hand of a user and comprising a one piece body having top and bottom surfaces, said body defining:

a scraping blade at one end thereof comprising

a deflecting surface extending obliquely from said top surface toward said bottom surface, and

a scraping edge;

a handle section remote from said one end located at the extremity of the body of said scraper, said handle section having a longitudinal axis; and

an intermediate section curved to define

a concave portion of said bottom surface extending between said blade and handle section below said axis and

a convex portion of said top surface extending between

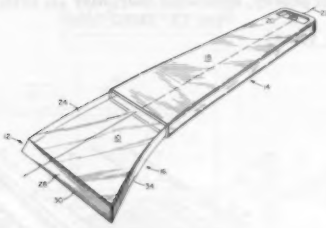
said blade and said handle section and projecting below said axis;

the transverse dimensions of said body, perpendicular to said axis, being greatest at said blade section and being continuously less toward the end remote therefrom;

said scraper being operable during scraping to permit force to be applied longitudinally of a surface to be scraped with the hand of the user remaining substantially spaced from the surface to be scraped,

with ice thrown by the deflecting action of said deflecting surface and said convex portion of said top surface being substantially deflected away from said hand of said user, and

with said deflecting surface being oblique relative to said surface to be scraper;



said handle section, on lateral edges thereof, providing a generally wedge shaped handle configuration operable to progressively resist pushing force imposed on said handle section and directed toward said scraping blade;

said convex portion of said top surface being progressively more steeply inclined away from said longitudinal axis of said handle section and operable to provide the greatest resistance to movement of ice over the top surface of said scraper adjacent said scraping blade;

said handle section being grippable on the underside thereof adjacent a free end of said handle section; and

said intermediate section, or said convex portion of said top surface being substantially free of obstructions to the removal of ice therefrom.

4,040,141

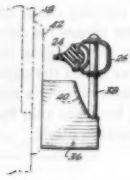
WINDSHIELD WIPER INSTALLATION

Alvan D. O'Steen, 1813 S. Dixie, West Palm Beach, Fla. 33401

Continuation-in-part of Ser. No. 513,573, Oct. 10, 1974, abandoned. This application Jan. 9, 1976, Ser. No. 647,701

Int. Cl.[2] B60S *1/04*

U.S. Cl. 15—250.19 **3 Claims**



1. In combination with a vehicle having a windshield including an arcuate, convex outer surface and a lower horizontal margin, a windshield wiper shaft adjacent the margin and a windshield wiper assembly for wiping an arcuate sector of the upper convex surface bordered by a portion of the lower horizontal margin, said windshield wiper assembly including:

a support arm with a first end zone and a second end zone and said arm being normally disposed below the horizontal margin of the windshield at an "at rest" parked position,

means to mount the second end zone to said shaft for cyclical movement of said arm through an arc over a portion of said convex outer surface adjacent said lower horizontal margin;

an elongate wiper blade holder portion having a first end, a second end and an intermediate length with a mid-zone, and means mounting the mid-zone to the first end zone of said support arm for movement therewith from said normal "at rest" parked position below the horizontal margin and cyclically through said arc;

said assembly including a resilient blade portion extending longitudinally of said elongate blade holder portion and projecting toward said horizontal margin and convex outer surface,

means holding said blade portion to said holder portion and including means normally spring urging the resilient blade outwardly of the holder portion and toward wiping engagement with the convex outer surface,

a blade parking means on the vehicle and means to fix the blade parking means below the horizontal margin and said parking means including structure projecting laterally toward the elongate blade holder portion on said support arm when said arm is at the at rest position,

said blade parking means comprising a first and a second cam block element in spaced relation with respect to one another and each including a cam track extending vertically and diverging angularly from said convex outer surface adjacent the horizontal margin of the windshield and having a portion comprising a support portion when said wiper blade is in the at rest position,

said elongate blade holder portion having a first and a second cam follower surface each adjacent said first and second ends respectively and each engaging respectively said first and second cam block element at said support portions when at the at rest position and said cam follower surfaces being adapted to progressively bias the elongate wiper blade holder portion and the resilient wiper blade out of engagement with the vehicle upon movement below the horizontal margin of the windshield to the at rest position, whereby movement of the at rest position of the windshield wiper assembly results in the resilient wiper blade being spring urged into engagement with the outer convex windshield surface portion, said follower surfaces each comprising outwardly projecting portions and

said cam tracks each including said cam surface and side guide surfaces sized to receive said projecting portions of the cam follower surfaces therebetween to constrain the same to movement to the at rest position and to maintain the assembly against lateral forces.

4,040,142

SAFETY DEVICE MORE PARTICULARLY FOR RABBET OF DOOR

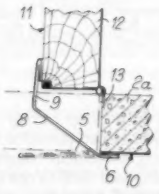
Marceau Ippolito, Lot 55, Rue des Tiamas, Abidjan, Ivory Coast

Filed July 7, 1975, Ser. No. 593,315

Claims priority, application France, Aug. 13, 1974, 74.27992

Int. Cl.[2] E05D *11/00*

U.S. Cl. 16—137 **6 Claims**



1. In combination with a door or the like, mounted by a hinge to a supporting casing, a safety device for covering the

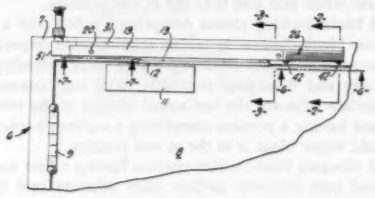
gap between the door and casing, comprising a bellows having four parallel panels, the opposing outer panels of which being attached respectively, to the door and the casing on the side opposite the hinge, inner panels of which being articulatingly connected therewith and with each other in a manner so that when the door is closed said panels automatically fold over each other and flat over the door itself, the inner panel associated with the outer side panel attached to said door being narrower in width than the other inner panel, and said other inner panel folds over said smaller panel when said door is closed.

4,040,143

RELEASABLE DOOR HOLD-OPEN DEVICE

Thomas R. Lasier; William G. Rodseth, and Raymond H. Schnarr, all of Princeton, Ill., assignors to Schlage Lock Company, San Francisco, Calif.

Filed Aug. 6, 1976, Ser. No. 712,237
Int. Cl.[2] E05F *15/20*
U.S. Cl. 16—48 J **7 Claims**



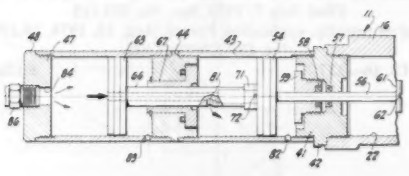
1. A releasable door hold-open device comprising an elongated channel defining an internal guide, a door connector, a traveller on said door connector adapted to travel in a predetermined path in said guide, holding means on said channel movable between a first position in engagement with said traveller and a second position out of engagement with said traveller, a solenoid adapted when energized to hold said holding means in said first position, means for mounting said solenoid at one end of said elongated channel, an electric smoke detector, means for mounting said detector at the other end of said elongated channel, at least one electrical conductor connected to said detector and to said solenoid, and means for disposing said conductor along said channel at one side of but out of said path.

4,040,144

DOOR ASSISTER

Thomas R. Lasier, and Raymond H. Schnarr, both of Princeton, Ill., assignors to Schlage Lock Company, San Francisco, Calif.

Filed May 24, 1976, Ser. No. 689,103
Int. Cl.[2] E05F *3/00*
U.S. Cl. 16—66 **7 Claims**



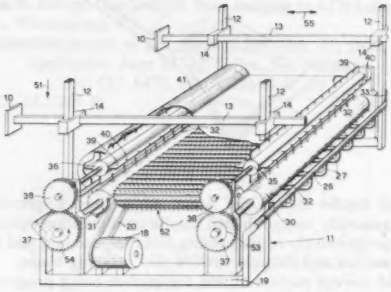
1. A door assister for a door closer having a cylinder with a piston movable in a predetermined direction therein against a resistance for door opening movement comprising a cylindrical shell, means for securing said shell to one end of said cylinder as a continutation thereof, a booster plunger movable in said shell in said predetermined direction and adapted to abut said piston, means cooperating with said shell for defining a booster compartment partially bounded by said booster plunger, a main plunger movable in said shell in said predetermined direction and adapted to abut said booster plunger, means cooperating with said shell for defining a main compartment partially bounded by said main plunger, and means for supplying said booster compartment and said main compartment with fluid under pressure insufficient to move said piston against all of said resistance.

4,040,145

MACHINE FOR LOOSENING AND REMOVING TEXTILE FIBERS FROM FIBER BALES

Angelo Marzoli, Bergamo, Italy, assignor to F. lli Marzoli & C. S.p.A., Palazzolo Sull'Oglio, Italy

Filed May 18, 1976, Ser. No. 687,601
Claims priority, application Italy, May 21, 1975, 23584/75
Int. Cl.[2] D01G *7/06*
U.S. Cl. 19—81 **8 Claims**



1. An apparatus for loosening and removing textile fibres from bales, said apparatus comprising a framing adapted to contain at least one fibre bale, a carriage supported from said framing with means for vertical and horizontal translation movement for movement relative to said bale, a driven carding cloth mounted on said carriage, said cloth having upper and lower traveling laps and lateral edges, bars on said carriage extending below said carding cloth, said bale having a top surface engaged by said bars when the carriage is lowered, said carding cloth having an active surface for contacting said top surface of the bale and removing fibres therefrom when the carriage is lowered and the bars engage the bale, said bars extending substantially parallel to said active surface of the carding cloth and arranged crosswise relative to the direction of travel of the laps of the carding cloth, conveying cylinder means on said carriage on each side of the carding cloth for removing fibres from said bale and bringing the fibres onto the upper lap of the carding cloth upon horizontal movement of the carriage, motor means for driving said conveying cylinder means in rotation for bringing the fibers removed from said bale onto the upper lap of the carding cloth, each said conveying cylinder means including a conveying cylinder with metal spikes projecting between said bars; and means for removing fibre from said carding cloth.

4,040,146

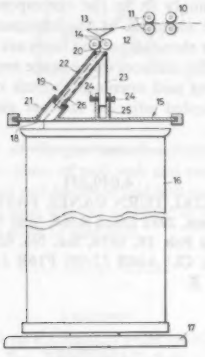
DEVICE FOR DISTRIBUTING TEXTILE FIBER SLIVERS INSIDE COLLECTION BOXES IN SPINNING PREPARATION MACHINES

Angelo Marzoli, Bergamo, Italy, assignor to F. lli Marzoli & C. S.p.A., Palazzolo Sull'Oglippo, Italy

Filed Feb. 23, 1976, Ser. No. 660,314
Claims priority, application Italy, Feb. 27, 1975, 20727/75
Int. Cl.[2] B65H *54/80*
U.S. Cl. 19—159 R **4 Claims**

1. Device for distributing textile fiber slivers inside collection boxes in spinning preparation machines, in particular at

the outlet of drawing frames, comprising a plate rotating above a collection box, an eccentric outlet on said plate, a duct fixed to said plate, said duct having a substantially axial inlet and an eccentric outlet, and guide calenders, said eccentric outlet being connected by said duct to said axial inlet facing said guide calenders for the sliver leaving the machine, said duct comprising two tubular portions, one portion being partially inserted in the other, one portion defining the duct inlet, said tubular portions forming an annular passage external to the



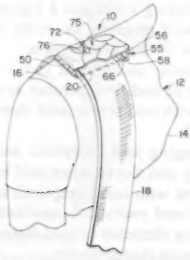
portion defining the duct inlet, said annular passage being formed between said tubular duct portions and communicating with the atmosphere at one end and with the eccentric outlet of the duct at the other end; an axial rod fixable to said plate and having a free end, means for adjusting the spacing of the free end of the axial rod from said plate, the inlet portion of the duct being supported at said inlet by said axial rod fixable to said plate, the height of said inlet portion being adjustable by said adjusting means.

4,040,147

SHOULDER STRAP RETAINER

Marguerite King, Trevecca Towers 11 Apt. 1431, 84 Lester Ave., Nashville, Tenn. 37210

Filed July 19, 1976, Ser. No. 706,176
Int. Cl.[2] A44B *9/00*
U.S. Cl. 24—86 A **5 Claims**



1. A shoulder strap retainer comprises:

a. a base having a fixed end and free end adapted to be positioned on the exterior shoulder portion of a garment;

b. securing means attached to the undersurface of said base for removably securing said base to the exterior shoulder portion of the garment, said securing means includes a pin pivotally mounted at one end thereof, with the other end having a point for piercing the garment and releasably held in place relative to said base;

c. a flexible cover having a free end and a fixed end attached to said fixed end of said base for movement between open and closed positions and extending in a common overlapping plane for defining a pocket to contain the shoulder strap;

d. locking means for retaining said flexible cover releasably secured to the free end of said base to retain the strap in the pocket, said locking means integrally formed with said flexible cover and having a downwardly projecting arm terminating in an inwardly projecting catch designed to slightly overhang the free end of said base to retain said flexible cover in the closed position of the retainer;

e. releasing means for disengagement of said catch from the free end of said base so that said strap is positionable into or out of the pocket, said releasing means including fulcrum means laterally displaced from said free end of said base and vertically extending above said base by a distance such that a manually applied downwardly extending force against said cover between said fixed end and said fulcrum means causes a deflection of said cover therebetween and an angular outward displacement of said catch for disengagement with said free end of said base so that release thereof is obtained, and

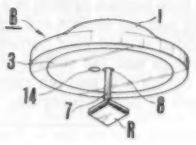
f. means for pivotably securing said fixed end of said base and said cover together, such that said cover may be opened into non-overlapping relation with said base to permit the strap to be placed in position on said base.

4,040,148

BUTTON FOR CLOTHES

Noriyoshi Fukumoto, No. 942 Shimoishihara, Chohu, Tokyo, Japan

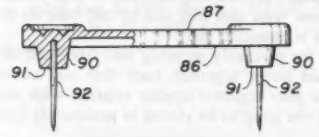
Filed Sept. 10, 1975, Ser. No. 611,946
Int. Cl.[2] A44B *1/38*
U.S. Cl. 24—108 **6 Claims**



1. A button for clothes comprising in combination: a button body and a reverse button as a set; said reverse button having an integrally formed needle member and an arrowhead portion formed protrudely at the tip of the needle member; said button body formed by an ornament member having an inside cavity with a bottom opening and a base plate; said base plate having an axial hole for insertion of the needle member and being formed in the center of the base plate as a through hole; said base plate having a concave surface formed on its upper surface to place an engaging disc member on the concave surface; said engaging member formed of a thin plate material having resiliency including a ring portion to be retained by the base plate at the lower edge of the ornament member and an engaging means for engaging the needle member inserted in the axial hole of the base plate; said engaging means being formed of a pair of pawl pieces extending toward the center from the right and left symmetrical positions of the ring portion; said pawl pieces being opposed to each other at their tip portions to form a circular hole by semi-circular notched portions of the tip portions; said needle member inserted into the axial hole of the base plate; said engaging means being such that the diameter of the axial hole of the base plate is sufficient to allow the insertion of the arrowhead portion of the needle member of the reverse button; said circular hole formed by said semicircular notched portions of said two pawl pieces of the engaging member being made to coincide with the axial hole of the base plate; said circular hole being made to have a slightly smaller diameter as compared with that of the axial hole of the base plate; said circular hole diameter being sufficient to effect meshing engagement at the reverse side of the arrowhead

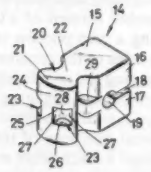
portion of the needle member; said base plate being formed with a through hole and being provided with a detaching means for removing the reverse button engaged on the button body, and said detaching means being such that the through hole being formed at a position where one of the pawl pieces of the engaging member is located and also a position closer to the tip of said pawl piece.

4,040,149
MOUNTING EYE
Ruediger Einhorn, Katonah, N.Y., assignor to Coats & Clark, Inc., Stamford, Conn.
Division of Ser. No. 489,051, July 16, 1974, Pat. No. 3,911,516. This application July 22, 1975, Ser. No. 598,065
Int. Cl.[2] A44B *9/00, 21/00;* **F46G** *11/00*
U.S. Cl. 248—493 **6 Claims**



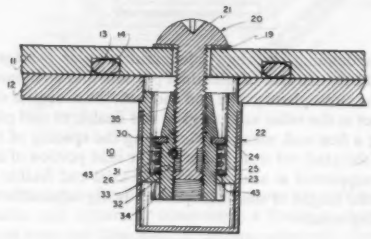
1. In a hanger for mounting a picture to a wall wherein the hanger is adapted to be mounted to the back of a picture frame to suspend the same from a wall; the improvement wherein said hanger comprises a picture wire of suitable length having spaced ends and a pair of push pin members each having a base portion and a wire end receiving loop portion extending from said base portion, said base portion having a flat surface, whereby said loop portion extends in a plane at an acute angle to the plane of said flat surface and a pin having an end completely embedded in said base portion and a sharpened end extending through said flat surface at an acute angle to the plane of said flat surface, said pin extending substantially normal to the plane of said loop portion.

4,040,150
SLIDE FASTENER HAVING DISCRETE COUPLING ELEMENTS
Takeo Fukuroi, Uozu, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Japan
Filed Mar. 18, 1976, Ser. No. 668,042
Claims priority, application Japan, Mar. 27, 1975, 50-41734[U]
Int. Cl.[2] A44B *19/06*
U.S. Cl. 24—205.13 R **3 Claims**



1. In a slide fastener of the type including a pair of stringer tapes, and a series of uniformly spaced fastener elements carried on each of said stringer tapes, each of the fastener elements having generally rectangular body which has a coupling end portion and a pair of parallel spaced apart legs extending rearwardly therefrom to hold a longitudinal edge portion of said stringer tapes therebetween, said coupling end portion projecting beyond the longitudinal edge at right angles to the axis of the slide fastener, and having a rounded head and a neck integral therewith, said head and said neck being complementary in shape to each other, said neck portion being defined by a pair of recesses disposed symmetrically with respect to the axis of said body, the improvement wherein said head portion has a pair of openings formed in the rounded front end face thereof, each of said openings being defined by a pair of parallel spaced apart, opposed upper and lower flat walls and a pair of vertical walls extending therebetween, said vertical walls extending at an angle to each other, and said neck portion including a pair of lugs at sides thereof adjacent said legs, said lugs being complementary in shape to said openings and so disposed as to snugly fit in the corresponding openings of adjacent fastener elements of the companion stringer tape when the fastener elements on said tapes are coupled together, said lugs having flat surfaces that engage respective upper and lower flat walls of said openings to limit relative tilting displacement of coupled adjacent fastener elements when said tapes are flexed.

4,040,151
PARTIAL TURN PANEL FASTENER
Collen Kieth Brimm, 2981 Ditch Road, Simi Valley, Calif. 93063
Filed Feb. 19, 1976, Ser. No. 659,585
Int. Cl.[2] A44B *17/00;* **F16B** *19/00*
U.S. Cl. 24—221 K **4 Claims**

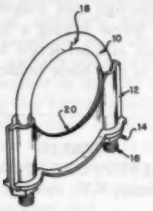


1. Partial turn fastening means adapted to hold a first and second apertured members together, comprising;
a receptical positioned on one side of said second member over the aperture therein; and
a retaining assembly including key portions extending through the aperture in the first member into engagement with the receptical in said second member;
said receptical including a slot and a region for holding the key portion of said retaining assembly through said slot upon partial turn of said key portion;
said retaining assembly including a screw with its head on the exposed side of said first member and a sleeve having threads mated with said screw, said sleeve including said key portion; and
spring means engaging said receptical and said sleeve for partially ejecting said sleeve when said key member is not in an engagement with said receptical; and
said screw, sleeve and receptical constituting the fastening pressure applying elements of said fastening means without spring elements therebetween.

4,040,152
SADDLE FOR U-BOLT CLAMP
Carl Gilgallon, 24407 Tamarack Circle, Southfield, Mich. 48075
Filed Jan. 7, 1977, Ser. No. 757,501
Int. Cl.[2] B65D *63/00;* **F16L** *33/10*
U.S. Cl. 24—277 **8 Claims**

1. A saddle for a U-bolt clamp comprising two thicknesses of sheet metal secured together in face-to-face relation by spot welding, said saddle having a central flat web provided with upright parallel tubular portions adjacent the laterally opposite ends thereof for slideably receiving the threaded legs of a

U-bolt, the upper edge of said web between said tubular portions being of generally semicircular shape to encircle approximately one-half of the circular periphery of a pair of telescopically engaged tube sections, the lower edge of said web being



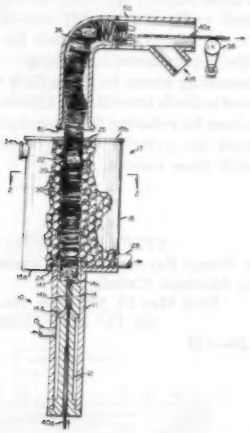
defined by a pair of flanges turned outwardly in opposite directions from the plane of said web and extending throughout the width of said web between said bolt-receiving portions, said sections being spot welded together at least along a line adjacent the lower edge of said web.

4,040,153

METHOD AND APPARATUS FOR RESTRAINING A YARN WAD

Charles S. Hatcher, Greenville, and Gary S. Atchley, Pauline, both of S.C., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 8, 1976, Ser. No. 674,806
Int. Cl.[2] D02G *1/20, 1/16, 1/12*
U.S. Cl. 28—221 **12 Claims**



1. Apparatus comprising:

a first cylinder having first and second annular members and an inner wall;

a second cylinder having inner and outer walls, said second cylinder being positioned inside, adjacent to and coaxially aligned with said first cylinder, said second cylinder having a plurality of troughs communicating the inner and outer surfaces thereof; and

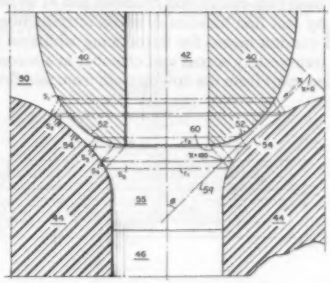
a plurality of balls of sufficient size to be retained within the space defined by the inner wall and the first and second annular members of said first cylinder and the inner wall of said second cylinder but of sufficient size to permit the surfaces of a portion of the balls to extend beyond the inner surface of said second cylinder.

4,040,154

JET TEXTURING PROCESS AND APPARATUS

Myrne Rodney Riley, Fayetteville, N.C., assignor to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 533,600, Dec. 17, 1974, abandoned. This application Oct. 30, 1975, Ser. No. 627,307
Int. Cl.[2] D02G *1/16*
U.S. Cl. 28—273 **14 Claims**



1. A jet nozzle for texturing thermoplastic yarn, comprising:

a fluid chamber;

a needle element positioned in said fluid chamber, said needle element having an axial yarn passage therethrough;

a throat element positioned downstream of said needle element, said throat element having an axial yarn passage aligned with the axial passage of said needle element;

The respective adjacent surfaces of said needle element and said throat element defining between them a flow passage communicating with said fluid chamber and converging toward said yarn passage of said throat element for flow of fluid therethrough to a yarn impingement zone;

said flow passage further characterized in that, on a succession of hypothetical frusto-conical sections taken along said flow passage in the direction of flow in such fashion that the surface of each of said sections is perpendicular to the direction of flow through said flow passage, the projections of the respective flow areas thereon become initially successively smaller and then successively larger so that the magnitudes of said successive areas pass through a minimum without undergoing any mathematical discontinuity, whereby a fluid passing through the flow passaage areas is accelerated to a velocity in excess of Mach **1** prior to impingement upon yarn in the yarn impingement zone and impinges upon the yarn in the yarn impingement zone at a velocity in excess of Mach 1 and at an angle causing texturing of the yarn.

4,040,155

APPARATUS FOR CRIMPING SYNTHETIC THERMOPLASTIC FIBERS

James K. Hughes, Bartlesville, Okla., and Wayne K. Erickson, Greenville, S.C., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 319,136, Dec. 29, 1972, Pat. No. 3,911,539. This application Aug. 26, 1975, Ser. No. 607,972
Int. Cl.[2] D02C *1/12*
U.S. Cl. 28—248 **7 Claims**

1. Apparatus for crimping synthetic thermoplastic fibers in the presence of steam, comprising, in combination:

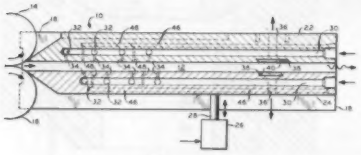
a compaction chamber having an upstream end and a downstream end;

means for continuously feeding said fibers into said upstream end of said chamber into contact with a mass of crimped fibers held compacted therein and cause said introduced fibers to form crimps therein as they contact said mass, and for advancing said fibers substantially unformily and

successively through a defined first region of low but increasing steam pressure, a defined second region of relatively high and substantially constant steam pressure, and a defined third region of decreasing steam pressure, of said chamber;

first conduit means for introducing steam into and transverely across said chamber at a first location adjacent but downstream from said upstream end of said chamber, with said first region being defined at its upstream end by said upstream end of said chamber and at its downstream end by said first location of steam introduction;

second conduit means for introducing additiona steam into and transversely across said chamber at a second location spaced apart from the downstream from said first location,



with said first and second locations of stream introduction establishing and defining therebetween and second region of said chamber, and with said third region of said chamber being defined at ist upstream end by said second location of steam introduction;

wherein said first location is the most upstream location for introducing steam into said chamber, said second location is the most downstream location for introducing steam into said chamber, and both of said first and second locations are located in the upstream one-half of said chamber;

means for obtaining a measurement of the steam pressure in said second region; and

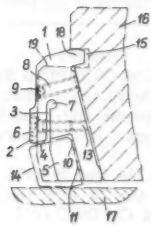
flow control means for controlling the flow rate of steam through said conduit means responsive to said pressure measurment and thereby maintaining said substantially constant steam pressure in said second region.

4,040,156

ADJUSTING DEVICE FOR MILLING CUTTERS

Hans Tack, Heiligenhaus, Germany, assignor to Fried. Krupp Gesellschaft mit beschrankter, Essen, Germany

Filed Apr. 16, 1976, Ser. No. 677,852
Claims priority, application Germany, Apr. 17, 1975, 2516944
Int. Cl.[2] B26D *1/00*
U.S. Cl. 29—96 **4 Claims**



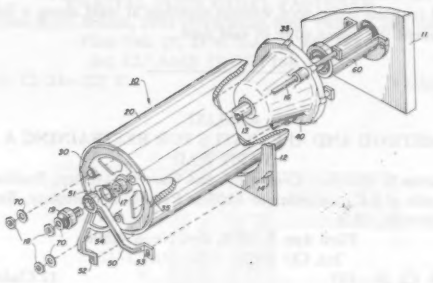
1. In a blade holder component secured to a revolving milling cutter body and having wall means defining a recess for receiving a cutting blade and supporting the cutting blade inserted in the recess; an adjusting device having a resiliently deformable tongue forming an integral part of the blade holder component and being in engagement with the cutting blade; a set screw connected to the resiliently deformable tongue for changing the position of the latter to adjust the orientation of the cutting blade in the recess; the improvement wherein said resiliently deformable tongue is defined by a single slot extending into the blade holder component from the zone of the blade-receiving recess, said tongue having a root and a free terminal portion, said free terminal portion including a support area for engaging the cutting blade received in said recess; said set screw passing through said tongue and traversing said single slot, said set screw having a head engaging, with a shoulder, said tongue; said set screw having an end portion threadedly engaged in said blade holder component adjacent said tongue.

4,040,157

DRUM SUPPORT APPARATUS

Alan L. Shanly, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jan. 8, 1976, Ser. No. 647,486
Int. Cl.[2] B21B *31/08*
U.S. Cl. 29—123 **10 Claims**



1. In a drum support apparatus including a shaft, outboard and inboard endbells releasably connected by tierods and adapted to be placed on the shaft for supporting a drum thereon; the improvement comprising:

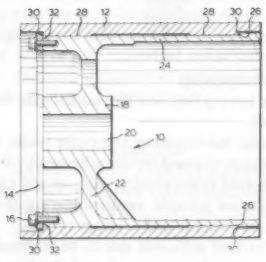
non-penetrating means on the surface of said outboard and inboard endbells immediately adjacent the inner surface of said drum for reducing the contact area where interface fit between the endbells and the drum occurs to thereby diminish drum run-out.

4,040,158

STEEL MILL ROLLS

Frederick George Payne, Dundas, Canada, assignor to Canron Limited, Montreal, Canada

Filed May 17, 1976, Ser. No. 686,717
Int. Cl.[2] B21B *31/08*
U.S. Cl. 29—123 **5 Claims**



1. A roll construction comprising:

a core member adapted for mounting upon a shaft;

an outer shell member; and

a retaining member;

the core member having an outer surface of uniform radius extending from and including one end and being provided at the other end with a radially-outwardly-extending shoulder;

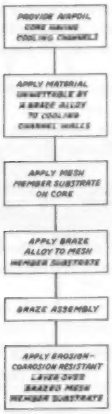
the outer shell member being an axial sliding fit on the said core member outer surface and having respective radially-inwardly-extending shoulders adjacent its ends and equally spaced therefrom, each shell member shoulder being engageable with the said core shoulder upon mounting of the shell member on the core member for positioning and retaining the former axially on the latter, the length of the shell member between the said inwardly-extending shoulders being equal to the length of the said core member outer surface whereby the said core member one end and the adjacent shell member shoulder register axially with one another; and

the retaining member comprising a flat ring mounted to the core member said one end and engageable with the axially registering shell member shoulder not engaged by the core member shoulder for retention of the shell member on the core member.

4,040,159
METHOD OF MANUFACTURE OF COOLED AIRFOIL-SHAPED BUCKET

Kenneth A. Darrow, Sprakers; Paul H. Kydd, Scotia, and John W. Daly, Quaker Street, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Oct. 29, 1975, Ser. No. 626,633
Int. Cl.² B23P *15/04*
U.S. Cl. 29—156.8 H **5 Claims**

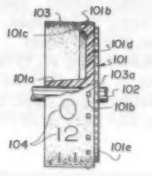

PROVIDE AIRFOIL CORE HAVING COOLING CHANNELS
APPLY MATERIAL UNWETTABLE BY A BRAZE ALLOY TO COOLING CHANNEL WALLS
APPLY MESH MEMBER SUBSTRATE ON CORE
APPLY BRAZE ALLOY TO MESH MEMBER SUBSTRATE
BRAZE ASSEMBLY
APPLY EROSION-CORROSION RESISTANT LAYER OVER BRAZED MESH MEMBER SUBSTRATE

1. A method of forming an airfoil-shaped body which comprises providing an airfoil core having cooling channels recessed into the surface thereof, applying material unwettable by a braze alloy to the surfaces of the cooling channel walls, applying a calendered multilayer flexible mesh member substrate on the core, affixing the mesh member substrate to the core, applying braze alloy to the mesh member substrate, brazing the assembly thereby filling completely the mesh member pores and bonding further the mesh member substrate to the core, and applying an erosion-corrosion resistant layer over the brazed mesh member substrate completing the airfoil-shaped body.

4,040,160
METHOD OF MANUFACTURING SYMBOL INDICATION DRUM

Takashi Funaki, Nagano, Japan, assignor to Kabushiki Kaisha Sankyo Seiki Seisakusho, Japan

Division of Ser. No. 585,772, June 11, 1975, which is a continuation of Ser. No. 410,336, Oct. 29, 1973, abandoned. This application July 22, 1976, Ser. No. 707,505
Claims priority, application Japan, Nov. 4, 1972, 47-127312[U]
Int. Cl.² B21D *53/26;* B21K *1/28, 1/42*
U.S. Cl. 29—159 R **14 Claims**

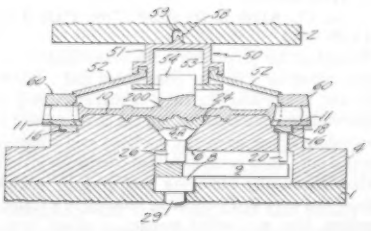


1. The method of manufacturing a rotatable symbol indication drum having indicia extending around its external periphery comprising the steps of forming a drum body including an axially elongated hub, an annular web extending radially from said hub, and a cylindrical rim extending axially from the outer end of said web concentric with said hub; preparing a relatively elongated indicia-carrying belt, having a length substantially equal to the external circumference of said cylindrical rim of said drum body, by providing a series of inked indicia thereon in correctly positioned longitudinal and lateral relation to each other and centered, laterally of said belt, at the same predetermined distance from a reference lateral edge of said belt; forming a series of perforations in said belt in adjacent spaced relation to said reference lateral edge at equal longitudinal spacings from each other and at equal lateral spacings from said reference lateral edge; forming a series of projections on said cylindrical rim of said drum body at equal circumferential spacings from each other equal to the longitudinal spacings of said perforations and at equal lateral spacings from a reference lateral edge of said rim; winding said belt circumferentially around said rim of said drum body by engaging said projections in said perforations; and securing said belt on said drum body; said perforations serving as symbol position ascertaining marks while said projections serve for correctly positioning the symbols around said rim of said drum body.

4,040,161
APPARATUS AND METHOD FOR REMOVING A PLURALITY OF BLADE DIES

George W. Kelch, Palm Beach, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Filed Nov. 25, 1975, Ser. No. 635,188
Int. Cl.² B21D *45/00;* B22D *17/00*
U.S. Cl. 29—239 **10 Claims**



1. A rim blade die removal tool comprising a central hub

having a plurality of arms extending radially therefrom, means pivotally connecting one end of each of said arms to said central hub, the outer ends of said arms being contoured, each end of each arm being contoured for engaging an inner surface of one die of a plurality of rim blade dies and moving them radially outwardly when the central hub is moved axially.

4,040,162

METHOD OF PRODUCING COMPOSITE EXTRUDED ALUMINUM PRODUCTS FROM ALUMINUM SWARF

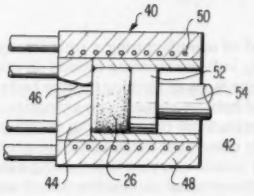
Mitsuyuki Isogai, Okazaki; Kouiti Tikusa, Nagoya, and Yosihiko Nakamura, Anzo, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Division of Ser. No. 506,809, Sept. 17, 1974, abandoned. This application Oct. 3, 1975, Ser. No. 619,168

Claims priority, application Japan, Sept. 17, 1973, 48-104737

Int. Cl.[2] B22F *3/24*

U.S. Cl. 29—420.5 **3 Claims**



1. A method of extruding composite products having a core and an external sheath comprising heating a die plate, pressure plate and an extrusion container at a constant temperature, compressing aluminum swarf into a billet having a bulk specific gravity of 1.4 to 2.1 preheating a billet of cast aluminum and said billet of compressed aluminum swarf to a temperature higher than the temperature of said die plate, pressure plate and extrusion container, placing said billet of cast aluminum in said container adjacent said die plate and placing said billet of compressed aluminum swarf between said billet of cast aluminum and said pressure plate, and forcing said billets through an extrusion orifice in said die plate to form an elongated extrusion having a core of said aluminum swarf and a covering of said cast aluminum.

4,040,163

METHOD FOR MAKING A CONTAINER OF COMPOSITE MATERIAL

Walter Tronsberg, Munich, Germany, assignor to Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft, Munich, Germany

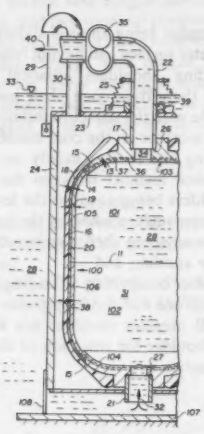
Filed June 30, 1975, Ser. No. 591,945

Claims priority, application Germany, July 5, 1974, 2432378; Nov. 5, 1974, 2452311

Int. Cl.[2] B21D *39/00;* B23P *17/00;* C23F *1/02*

U.S. Cl. 29—423 **14 Claims**

1. A method for producing a container made of composite material including a fibrous component and a bonding filler component, comprising the steps of manufacturing a hollow, dimensionally precise core having the shape of said container and including access openings, applying said composite material to said core, then permitting said composite material to set, and then chemically removing said core by enclosing said container and core in a protective housing in a sealed manner, connecting, also in a sealed manner, a closed loop removal agent circulating circuit to said access openings, immersing said protective housing with said container sealed therein into a removal agent bath which forms part of said closed loop circuit, and circulating a removal agent in said circuit until said



core or portions thereof have been removed through said access openings from the inside of said container.

4,040,164

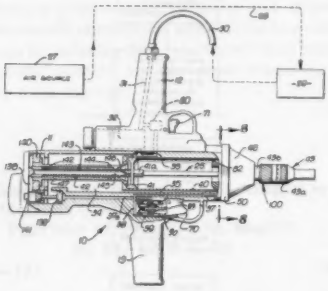
FASTENER DRIVING GUN

Franklin S. Briles, 1301 Dolphin, Corona Del Mar, Calif. 92625

Continuation-in-part of Ser. No. 552,334, Feb. 24, 1975, abandoned, which is a continuation-in-part of Ser. No. 379,106, July 13, 1973, abandoned. This application Mar. 12, 1976, Ser. No. 666,447

Int. Cl.[2] B25C *1/04*

U.S. Cl. 29—432 **17 Claims**



15. The method of operating a gun for driving a fastener forwardly in a work bore to seat a fastener therein, the gun including

a. a gun body containing a bore and a piston movable forwardly in the bore,

b. a striker carried by the gun to be driven forwardly by the piston for seating the fastener, a barrel receiving the striker and having telescopically interconnected sections which are relatively adjustable to control the barrel length, and

c. control means carried by the body including a first trigger operable to control passage of gas at a first pressure level to said bore to drive the piston and striker forwardly and a second trigger operable to control passage of gas at a higher pressure level to be controllably fed to said bore to drive the piston and striker forwardly, said method including

d. positioning the gun with the striker in alignment with the fastener partially inserted in the work bore, and with the tip of the barrel engaging the work,
e. operating the first trigger to effect partial seating of the fastener in the bore, and operating both triggers to effect complete seating of the fastener in the bore

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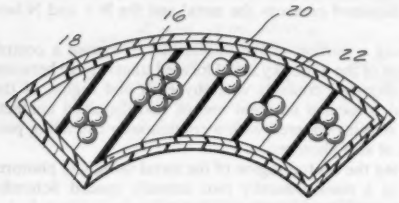
4,040,165

METHOD OF MAKING SYNTATIC MODULES

James D. Miessler, Westfield, and Arne I. Johnson, Springfield, both of Mass., assignors to Albany International Corporation, Albany, N.Y.

Filed Oct. 22, 1976, Ser. No. 734,954
Int. Cl.[2] B23P 3/00, 25/00
U.S. Cl. 29—458 12 Claims



1. The method of providing a pipe member with syntatic modules as floatation devices comprising the steps of:
a. forming a hollow preform mold having surfaces defining a cavity of desired configuration and forming a casting mold having surfaces defining a cavity of similar cross section including an arcuately convex surface for forming one surface of said modules with an arcuately concave surface thereof;
b. forming a woven roving of predetermined size to provide a skin;
c. forming a layer of spacing material of predetermined size and containing a plurality of voids therein;
d. attaching the roving to the spacer material to form a laminate thereof;
e. forming the laminate to the inside walls of the preform mold;
f. filling the preform mold with a plurality of hollow balls;
g. pouring a thin layer of resin into the preform mold to connect the balls and form the composite;
h. removing the composite from the preform mold and placing end sections of spacing material thereon before placing it into the casting mold;
i. adding a syntatic foam resin into the casting mold interior so as to fill all spaces between the balls and all voids in the spacer material;
j. curing said syntatic foam resin and removing said mold parts so as to produce a module;
k. repeating steps *b* through *j* to produce additional like modules; and
l. assembling said module segments around said pipe with the concave surfaces of said modules adjacent said pipe.

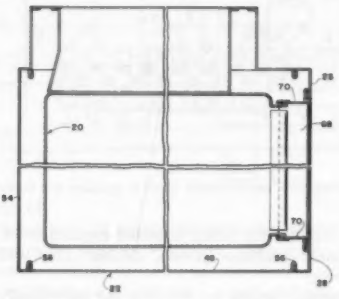
2. The method of making syntatic modules comprising the steps of:
a. forming a hollow preform mold having surfaces defining a cavity of desired configuration and forming a hollow casting mold having surfaces defining a cavity of the desired module configuration;
b. forming a woven roving of predetermined size to form a skin;
c. forming a layer of spacer material containing a plurality of voids and being of predetermined size;
d. attaching the roving to the spacer material to form a laminate thereof;
e. forming the laminate to the perform mold;
f. filling the preform mold with a plurality of hollow balls;
g. pouring a thin layer of resin into the preform mold to connect the balls and form a composite;
h. removing the composite from the preform mold and attaching spacer material sections to the ends and placing into the casting mold;
i. adding a syntatic foam resin into the casting mold interior so as to fill all spaces between the balls and all voids in the spacer material; and
j. curing said syntatic foam resin and removing said mold parts so as to produce said modules.

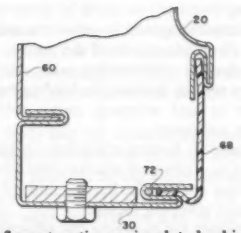
4,040,166

METHOD OF CONSTRUCTION OF INSULATED CABINET

Paul H. Morphy, Prairie Village, Kans., assignor to Hobart Corporation, Troy, Ohio

Filed Aug. 4, 1976, Ser. No. 711,442
Int. Cl.[2] B23P 3/00, 19/04
U.S. Cl. 29—460 8 Claims





1. A method of constructing an insulated cabinet comprising:
rigidly interconnecting in substantially precisely positioned relationship to each other a plurality of structural components to form a substantially rigid main structural frame,
loosely attaching additional components to said main frame in non-rigid relationship to each other and said main frame by mechanical connections permitting limited relative movement between said additional components and said main frame,
said main frame and loosely interconnected additional components defining an outer shell in which the components thereof are capable of relative limited movement,
positioning an inner shell within said outer shell in spaced relationship thereto thereby defining an insulating cavity therebetween,
squaring said outer shell to position said main frame and loosely connected additional components in their desired final relationship to each other,
while maintaining said main frame and said loosely connected additional components in said desired relationship to each other, substantially filling said insulating cavity with a hardenable insulating material, and

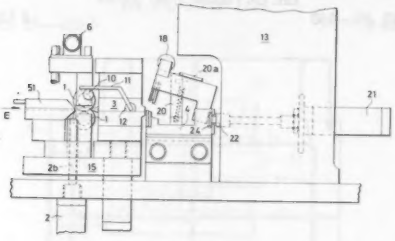
allowing said insulating material to harden in said cavity and fix said main frame and additional components in said desired relationship to each other and with said inner shell positioned in spaced relationship to said outer shell.

4,040,167

METHOD OF AND A MACHINE FOR SEPARATING AND FITTING INSULATED CONDUCTORS OF MULTI-CONDUCTOR RIBBON CABLES TO CONNECTORS IN HOUSINGS

Michael John Jepson, Stapleford, and Bernard Kilbourne, Breaston, both of England, assignors to The Breedon Press Limited, Long Eaton, United Kingdom

Filed Dec. 29, 1975, Ser. No. 644,587
Int. Cl.[2] H01R *43/04*
U.S. Cl. 29—564.4 **8 Claims**



1. A machine for fitting insulated conductors of an enlongated, multi-conductor ribbon, electric cable with contacts comprising:

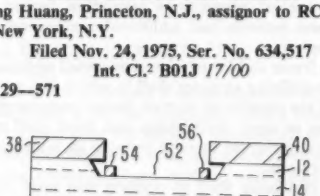
a. separator means for severing the individually insulated conductors at the leading end of said cable;
b. guide means for guiding said cable lengthwise to said separator means;
c. spreading means for transversely spreading the severed conductors;
d. stripping means adapted to receive the spread conductors for baring the leading ends of the same;
e. moving means for withdrawing said cable from said separator means and for locating the leading ends of the spread conductors in said stripping means while holding the conductors stationary;
f. feeding means for feeding a housing containing a plurality of contacts to a position wherein said contacts are adjacent respetive ones of the leading ends of the conductors bared by said stripping means;
g. engaging means for engaging the adjacent contacts with the bared leading ends of said conductors respectively.

4,040,168

FABRICATION METHOD FOR A DUAL GATE FIELD-EFFECT TRANSISTOR

Ho-Chung Huang, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Nov. 24, 1975, Ser. No. 634,517
Int. Cl.[2] B01J *17/00*
U.S. Cl. 29—571 **1 Claim**



1. In a method for making a dual gate field effect transistor comprising the steps of:

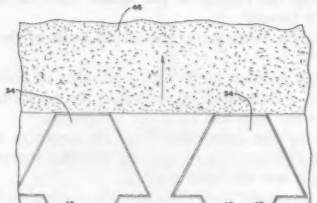
disposing a layer of a conductor adjacent a surface of an N+ layer of a semiconductor substrate;
forming an aperture in the conductor;
forming an aperture in the N+ layer congruent with the aperture in the conductor;
forming a blind aperture in an N layer adjacent the N+ layer congruent with the aperture in the N+ layer;
enlarging the aperture formed in the N+ and N layers whereby the conductor is cantilevered over the apertures in the N+ and N layers;
forming two disjoined contacts from said conductor separated by the apertures; and
disposing a Schottky metal adjacent a principal flat surface of the blind aperture in the N layer via the aperture defined by the conductor;
the improvement comprising the steps of:
disposing a layer of photoresist over the exposed surfaces of the disjoined contacts, the metal and the N+ and N layers;
removing a portion of the photoresist to expose a central region of the Schottky metal located transversely between the disjoined contacts whereby each end region of the metal is located adjacent one of said disjoined contacts and remains covered with a continuously extending portion of said photoresist;
removing the central region of the metal using said photoresist as a mask whereby two laterally spaced Schottky metal gates are formed; and
removing the photoresist remaining.

4,040,169

METHOD OF FABRICATING AN ARRAY OF SEMICONDUCTOR DEVICES

Ralph E. Rose, San Jose, Calif., assignor to Watkins-Johnson Co., Palo Alto and Signetics Corporation, Sunnyvale, both of, Calif.

Division of Ser. No. 447,981, March 4, 1974, Pat. No. 3,930,295.
This application Dec. 29, 1975, Ser. No. 644,515
Int. Cl.[2] B01J *17/00*
U.S. Cl. 29—577 **6 Claims**



1. In a method of fabricating an array of semiconductor devices on a substrate utilizing an alignment tool having a body with a plurality of spaced apart recesses with outwardly diverging side walls extending to one surface thereof, the steps of: forming a plurality of individual semiconductor devices having bonding pads on one side thereof and inclined side walls diverging toward the bonding pads, placing the individual semiconductor devices in the recesses in the alignment tool with the inclined walls of the semiconductor devices engaging the outwardly diverging walls of the recesses and the bonding pads protruding beyond the surface of the tool, forming a metallized layer on one surface of the substrate, positioning the surfaces of the alignment tool and the substrate in confronting relationship with the bonding pads aligned with predetermined portions of the metallized layer, heating the metallized layer to a predetermined temperature, and pressing the alignment tool and substrate together to bring the bonding pads into contact

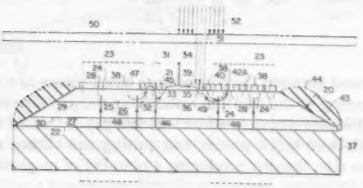
with the metallized layer and thereby effect bonding of the semiconductor devices to the substrate.

4,040,170

INTEGRATED GATE ASSISTED TURN-OFF, AMPLIFYING GATE THYRISTOR, AND A METHOD FOR MAKING THE SAME

Earl S. Schlegel, Pittsburgh, and Derrick J. Page, Export, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Division of Ser. No. 581,255, May 27, 1975. This application Aug. 24, 1976, Ser. No. 717,079
Int. Cl.[2] B01J *17/00*
U.S. Cl. 29—577 **5 Claims**



1. A method of making an integrated amplifying gate thyristor with gate assist turn-off capability comprising the steps of:

A. providing in a semiconductor body having first and second opposed major surfaces impurities to form in the body a main thyristor of four impurity regions of alternate type conductivity disposed alternately through the body between the major surfaces with a PN junction between each region, with one intermediate region adjoining the first major surface, the two impurity regions adjoining the first and second major surfaces being cathode-emitter and anode-emitter regions, respectively, the two intermediate impurity regions adjoining the cathode-emitter and anode-emitter regions being cathode-base and anode-base regions, respectively, and the cathode-base region adjoining the first major surface adjacent the cathode-emitter region;

B. providing in the semiconductor body an impurity to form in the body a pilot thyristor of said cathode-base, anode-base and anode-emitter regions of the main thyristor and at least one additional impurity region adjacent to and spaced from the cathode-emitter region of the main thyristor of conductivity-type to form a PN junction with said cathode-base region and a separate cathode-emitter region for the pilot thyristor;

C. providing in the semiconductor body an impurity to form in the body a diode of said cathode-base region of the thyristors and at least one additional impurity region being a cathode region adjacent to and spaced from the cathode-emitter regions of the main and pilot thyristors;

D. selectively masking against a radiation means portions of the first major surface of the semiconductor body adjoining the main and pilot thyristor, while leaving exposed portions of the first major surface adjoining the diode;

E. selectively irradiating the diode in the semiconductor body with said radiation means through said masking to reduce the current gain of the common cathode-base region at the diode to less than the ratio of I_{FB}/I_g, where I_{FB} is the forward anode current triggering the diode to function as a thyristor in the low impedance conducting state, and I_g is a specified gate assist turn-off current to turn-off the main thyristor;

F. positioning cathode and anode electrodes on said first and second major surfaces, respectively, to make ohmic contact with the cathode-emitter region of the main thyristor and the common anode-emittor region of the main and pilot thyristors;

G. positioning a gate electrode on said first major surface to make ohmic contact with the common cathode-base region adjacent to and spaced from the cathode-emitter region of the pilot thyristor and the cathode region of the diode; and

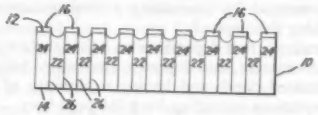
H. positioning a floating electrode on said first major surface adjacent to and spaced from the gate electrode to make ohmic contact with the common cathode-base region between the thyristors and the cathode-emitter region of the pilot thyristor.

4,040,171

DEEP DIODE ZENERS

Harvey E. Cline, and Thomas R. Anthony, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 568,920, April 17, 1975, Pat. No. 3,988,757, which is a continuation of Ser. No. 411,013, Oct. 30, 1973, abandoned. This application Apr. 22, 1976, Ser. No. 679,206
Int. Cl.[2] B01J *17/00*
U.S. Cl. 29—577 **32 Claims**



1. A method for making a deep diode zener comprising the process steps of

a. selecting a body of semiconductor material having two opposed major surfaces which are, respectively, the top and bottom surfaces thereof, a selected level of resistivity, a selected first type conductivity, a preferred planar crystal structure orientation for at least one of the major surfaces which is one selected from the group consisting of **(100)**, **(110)** and **(111)** and a vertical axis substantially aligned with a first crystal axis of the material of the body;

b. disposing an array of metal on the major surface having a preferred planar crystal structure orientation, the metal comprising at least one material suitable for imparting to a portion of the material of the body a predetermined level of resistivity and a predetermined second type conductivity;

c. heating the body and the metal array to an elevated temperature sufficient to form an array of melt of metal-rich semiconductor material on the major surface of the body;

d. establishing a temperature gradient in the body substantially parallel with the vertical axis of the body and the first crystal axis, the major surface having the array of metals being at the lower temperature;

e. migrating the array of metal-rich semiconductor material through the body from the major surface along the temperature gradient in the direction of the higher temperature to form a plurality of regions of recrystallized semiconductor material of the body having a selected second type conductivity and solid solubility of the metal of the array distributed substantially uniformly throughout the region, the level of concentration of the metal being determined by the temperature of migration, the type and the composition of the metal, and the semiconductor material migrated therethrough;

f. affixing a first ohmic electrical contact to one the regions of recrystallized semiconductor material of the body, and

g. affixing a second ohmic electrical contact to a selective portion of the original material of the body, the first and second contact arrangement being such as to cause the processed body to function as a zener diode when voltage is applied across the processed body between the two ohmic electrical contacts.

4,040,172

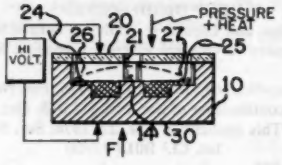
METHOD OF MANUFACTURING INTEGRAL TRANSDUCER ASSEMBLIES EMPLOYING BUILT-IN PRESSURE LIMITING

Anthony D. Kurtz, Englewood, and Joseph R. Mallon, Alpine, both of N.J., assignors to Kulite Semiconductor Products, Inc., Ridgefield, N.J.

Division of Ser. No. 573,624, May 1, 1975. This application Aug. 2, 1976, Ser. No. 710,570

Int. Cl.[2] H01C *17/02*

U.S. Cl. 29—580 6 Claims



1. A method for fabricating a semiconductor transducer, comprising the steps of:

a. forming a first depression on a first surface in a semiconductor wafer, said depression as formed being of a predetermined depth and having a plurality of "finger-like" projections extending from the periphery,

b. diffusing a serpentine piezoresistor within said depression and having a resistance line width approximately equal to said predetermined depth,

c. metallizing the surface of said depression to form a series of terminal areas extending into said projections,

d. covering said depression with a glass sheet,

e. bonding leads to said terminal areas within said projections.

4,040,173

FORMERS FOR COILS

Ian Leitch McDougall, Aldridge, England, assignor to Imperial Metal Industries (Kynoch) Limited, Birmingham, England

Filed Oct. 14, 1975, Ser. No. 622,158

Claims priority, application United Kingdom, Oct. 15, 1974, 44599/74

Int. Cl.[2] H01L *39/08*

U.S. Cl. 29—599 7 Claims

1. A method of manufacturing a superconductive magnet which comprises the steps of winding onto a former a wire containing the components of a superconductive intermetallic compound, and heating the assembly to a temperature such that the components of the compound react to form the intermetallic compound, characterised in that the former is of metal having a melting point greater than the temperature at which the reaction is carried out, and has on all portions of its surface contacted by the wire a coating of a refractory material non-reactive with the metal and non-reactive with the wire.

4,040,174

METHOD OF MANUFACTURING MAGNETIC HEADS

Naotsune Tsuda, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

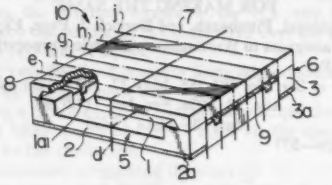
Filed July 8, 1976, Ser. No. 703,508

Claims priority, application Japan, July 31, 1975, 50-93768

Int. Cl.[2] G11B *5/42*

U.S. Cl. 29—603 5 Claims

1. A method of manufacturing magnetic heads comprising the steps of providing a pair of core block pieces each having a gap defining surface, cutting one of the core block pieces through the gap defining surface to provide a pair of fragment pieces, applying a thin film of a thickness corresponding to a desired gap length on the surface of the fragment pieces which is opposite to the gap defining surface to thereby provide a pair of offset block pieces, disposing the offset block pieces in juxtaposition with the remainder of said one core block piece, disposing the other core block piece on top of said one core block piece and the offset block pieces so that their gap defining surfaces are located opposite to each other, causing a gap forming material to melt and permeate into clearances which



are formed between the pair of core block pieces as a result of the presence of the thin film, solidifying the gap forming material to provide a core block in which a gap is formed between the both core block pieces, and cutting and slicing the core block to size, thereby producing a plurality of magnetic cores.

4,040,175

METHOD OF MAKING A MINIATURE PLUG-IN FUSE WITH FRAGILE FUSE LINK

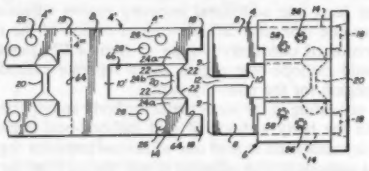
Harold L. Williamson, Northbrook, and Avinash P. Aryamane, Mount Prospect, both of Ill., assignors to Littelfuse, Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 432,980, Jan. 14, 1974, Pat. No. 3,909,767, and a continuation-in-part of Ser. No. 610,978, Feb. 8, 1975, Pat. No. 3,962,782. This application June 8, 1976, Ser. No. 693,936

The portion of the term of this patent subsequent to June 15, 1993, has been disclaimed.

Int. Cl.[2] H01H *69/02*

U.S. Cl. 29—623 16 Claims



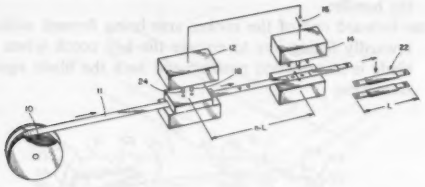
1. A method of making a plug-in fuse assembly comprising a plug-in element including a pair of terminals to be received by pressure clip terminals or the like, current carrying extensions extending from the inner end portions of the pair of terminals and a fuse-forming link interconnecting the current carrying extensions, said method comprising the step of providing a blank of fuse metal which is blanked to form a pair of spaced juxtaposed parallel terminals which are interconnected by a rigid web, current carrying longitudinal extensions of said terminals and a relatively weak fuse-forming link portion interconnecting said current carrying extensions, anchoring between said current carrying extensions a body of insulating material forming a rigid interconnection between said current carrying extensions, with the pair of terminals interconnected by the web on the outside of the body of insulating material, and blanking the exposed web of fuse metal interconnecting the terminals.

4,040,176

METHOD FOR MANUFACTURING INSULATED GROUNDING STRAPS

Robert C. Ferris, Chicago, Ill., assignor to Christiana Industries Corporation, Chicago, Ill.

Filed June 11, 1976, Ser. No. 695,116
Int. Cl.[2] H01B *13/06*
U.S. Cl. 29—624 2 Claims



1. A method of making an insulated grounding strap of a selected length having stripped and punched ends comprising the steps of:

a. feeding a continuous length of flexible conductor having an insulating covering from a supply reel,

b. punching two holes in said conductor, one on either side of a trailing point on said conductor which is said selected length behind a leading point on said conductor, each trailing point serving as the leading point for subsequent lengths of said conductor,

c. severing said conductor at each of said points, and

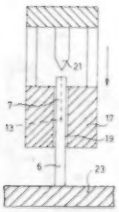
d. stripping a desired length of insulation form the severed ends.

4,040,177

METHOD OF MANUFACTURING AN ELECTRICAL CONTACT

Alfred Beeler, Horgen, Switzerland, and Wilhelmus Marinus Cornelius van der Mijden, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Division of Ser. No. 553,532, Feb. 27, 1975, abandoned. This application May 25, 1976, Ser. No. 689,946
Int. Cl.[2] H01R *9/04*
U.S. Cl. 29—630 C 5 Claims



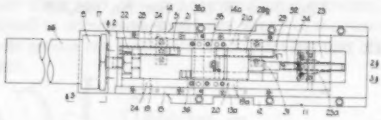
1. A method of manufacturing an electrical contact member from a bar of electrically conductive material, which comprises splitting the bar longitudinally over a portion of its length from one end into two parts, and plastically deforming the two parts to form contact tongues by bending such parts so that they diverge in opposite directions from the longitudinal dimension of the bar, flattening each part to provide respective flat surfaces, and bending such flattened parts so that they extend in spaced relation to each other approximately parallel to the longitudinal dimension of the bar with such flat surfaces oppositely disposed.

4,040,178

APPARATUS FOR ASSEMBLING A FLEXIBLE SLEEVE TO A LEAD

Robert Amphlett, Stoke-on-Trent, England, assignor to Rist's Wires & Cables Limited, Birmingham, England

Filed Dec. 24, 1975, Ser. No. 644,315
Claims priority, application United Kingdom, Jan. 16, 1975, 1865/75
Int. Cl.[2] H01B *13/22*
U.S. Cl. 29—745 10 Claims



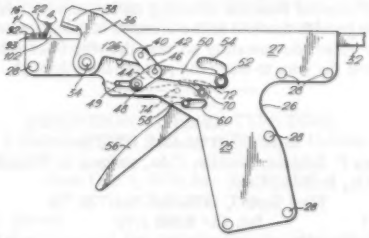
1. Apparatus for assembling a flexible sleeve to a rod-like component comprising a frame which, in use, is fixed, a sleeve carrier supported by the frame and movable linearly relative thereto between a rest position and an advanced position, first and second releasable latch means for restraining said sleeve carrier in said rest position and advanced positions respectively, a mandrel supported by said frame, and movable linearly relative to said frame in the same direction as said sleeve carrier, between a rest position and an advanced position, means for moving said mandrel, first latch release mean for releasing said sleeve carrier at a point in the movement of the mandrel wherein the mandrel has engaged in a sleeve carried by the sleeve carrier, means whereby after release of the sleeve carrier the sleeve carrier is moved with the mandrel to engage the sleeve, containing the mandrel, over the end region of a rod like component, second latch release means for releasing said sleeve carrier for return movement from its advanced position at a point during the return movement of the mandrel from its advanced position towards its rest position wherein the mandrel has been withdrawn from the sleeve, and sleeve carrier return means for returning the sleeve carrier to its rest position.

4,040,179

APPARATUS FOR MATING FIRST AND SECOND PORTIONS OF AN ELECTRICAL CONNECTOR

Miguel Ruiz Sanchez, Barcelona, Spain, assignor to AMP Incorporated, Harrisburg, Pa.

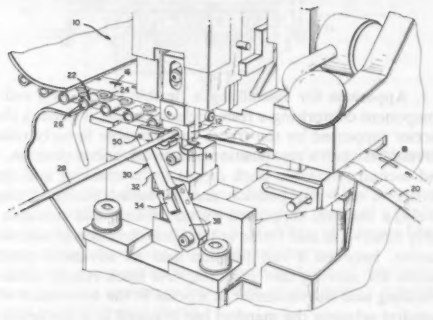
Filed Jan. 11, 1977, Ser. No. 758,374
Claims priority, application United Kingdom, Jan. 13, 1976, 01121/76; Apr. 7, 1976, 14018/76
Int. Cl.[2] H01R *43/04*
U.S. Cl. 29—749 15 Claims



1. Apparatus for mating first and second portions of an electrical connector to connect a terminal therein to a wire placed between the portions, the apparatus comprising a support for the first portion, a jaw, means for moving the jaw from a raised portion remote from the support, towards the support, to move the second portion into mating relationship with the first portion, means for displacing the support from a first position remote from the jaw to a second position in register

with the jaw when the jaw is in its raised position, and means for positioning the second portion with respect to the jaw prior to the support reaching its second position, to enable the jaw to move the second portion into mating relationship with the first portion.

4,040,180
WIRE CONE ASSEMBLY
Leon Richard Brown, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.
Filed June 15, 1976, Ser. No. 696,258
Int. Cl.[2] H01R *43/04*
U.S. Cl. 29—753 **5 Claims**



1. A wire cone assembly for use on a crimping press of the type having a crimping station and crimping dies for crimping a wire barrel terminal about an electrical wire and means for moving the crimped terminal laterally from the station, said wire cone assembly comprising:

a. an elongated arm with its lower end attached to a rotatable mounting block on the crimping press and having a laterally projecting member on its upper end;

b. an L-shaped lever having a first section positioned parallel to the laterally projecting member and a second section positioned at a right angle to the first section and extending across the free end of the laterally projecting member, said second section having a partially conical passage therethrough opening out in front of the crimping station and further having a slot on an upwardly facing surface extending for the length of the section and intersecting the passage so that a multi-strand wire may be laid into the passage through the slot for subsequent insertion into a wire barrel which may be positioned in the crimping station, said first section being pivotally attached at its free end to the laterally projecting member,

so that as the moving means on the crimping press move a crimped terminal from the crimping station, the wire lying in the passage with one end in the crimped terminal causes said lever to rotate downwardly so that the slot faces sideways permitting the wire to leave the passage therethrough.

4,040,181
LOCKING BLADE KNIFE
Lawrence P. Johnson, Boulder, Colo., assignor to Western Cutlery Co., Boulder, Colo.
Filed Sept. 7, 1976, Ser. No. 720,773
Int. Cl.[2] B26B *1/02*
U.S. Cl. 30—161 **9 Claims**

1. A locking blade knife comprising:

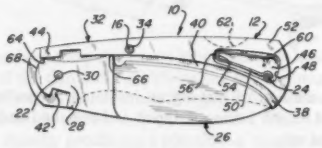
a handle including a pair of side scales arranged in spaced parallelism to provide between them an elongate narrow channel to receive a knife blade and a locking rocker arm, and secured in fixed relation by a center pin and a pair of end pins;

a knife blade having an apertured tang pivotally mounted on the end pin at the forward portion of the handle to provide for swinging of the blade between extended operating position and retracted position in this channel;

the back of the tang being formed with a key notch to receive a locking key for positively retaining the blade in extended position;

a locking rocker arm arranged in the channel and extending along the back of the handle throughout the major portion of the length of the handle and pivotally mounted intermediate its ends on the center pin for rocking movement in the handle;

the forward end of the rocker arm being formed with an inwardly facing key to engage the key notch when the blade is in extended position and lock the blade against retraction;

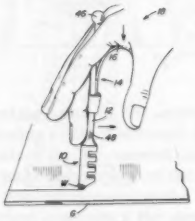


the aft portion of the rocker arm being formed with an aperture of predetermined size and shape throughout the thickness of the arm and so located that the aft end pin passes through it to serve as a fixed abutment anchorages;

the rocker arm being dimensioned in thickness to fit in sliding relation with the side scales to produce between the scales and the periphery of the aperture a totally enclosed pocket;

and a spring located in the pocket and engaging the anchorage and the arm to yieldingly urge the aft end of the arm in a direction outwardly of the back of the handle to force the key into locking engagement with the notch.

4,040,182
HOLDER FOR GLASS CUTTER
Dennis R. O'Dell, 2924 Downey St., Independence, Mo. 64056
Filed June 7, 1976, Ser. No. 693,486
Int. Cl.[2] B26B *25/00*; C03B *33/10*
U.S. Cl. 30—164.95 **8 Claims**



1. A holder for a glass cutter, comprising, in combination:

a. palm contacting means for steadying a glass cutter; and

b. attachment means for retaining the palm contacting means on a handle of the glass cutter, the palm contacting means being a bent member including a curved portion arranged for contacting the palm of an operator's hand. and a connecting portion having a substantially U-shape including a back section and a pair of spaced, substantially parallel, coextending legs depending from the back section, and the attachment means including a sleeve of rectangular cross section.

4,040,183

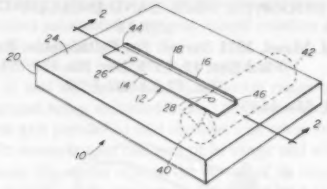
COIN ROLL OPENER

Robert X. Cassier, 115 Mount Auburn St., Cambridge, Mass. 02138

Continuation-in-part of Ser. No. 660,727, March 17, 1976, abandoned. This application Feb. 25, 1977, Ser. No. 771,952

Int. Cl.[2] B26B *27/00*

U.S. Cl. 30—296 R **10 Claims**



1. A device for opening a plurality of coins packaged in a paper wrapper defining a roll, said device comprising:

a. a thin body having a pair of relatively long parallel sides and a pair of relatively short parallel sides, a margin of one of said long sides bent upwardly to form a substantially L-shaped structure constituting a wide base and a narrow flange having a dulled edge, a longitudinal axis of said flange being disposed in parallel relationship to a longitudinal axis of said base, the width of said base is larger than the height of said flange, the length of said flange is at least as long as the circumference of the roll of coins, the height of said flange being sufficiently high to allow said flange to cut only through the paper wrapper when the roll of coins is rolled on said flange in a direction that is along the longitudinal axis of said flange;

b. a platform, said body mounted on an upper face of said platform; and

c. gripping means on a lower face of said platform for preventing movement of said platform when the roll of coins is rolled along said flange.

4,040,184

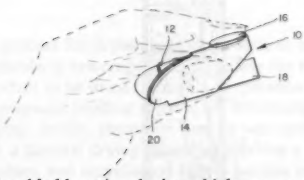
CUTTING INSTRUMENT

Tafari Hightower, 765 Rand Ave., Oakland, Calif. 94610

Filed Nov. 3, 1975, Ser. No. 627,961

Int. Cl.[2] B26B *27/00*

U.S. Cl. 30—298 **5 Claims**



1. A hand held cutting device which a person holds with his thumb and his second finger and guides with his first finger, comprising:

a. a rectangular razor blade of a certain size;

b. a first sidewall and a second sidewall, each of said sidewalls being substantially parallel to each other and substantially the same size as the size of said razor blade and having a top edge, a front edge, a back edge and a bottom edge, said bottom edges, said front edges and said top edges of said first and second sidewalls being joined together to form a casing in which to insert said razor blade with a corner portion of said sidewalls adjacent to said bottom edges and said front edges being removed in order to expose a portion of the cutting surface of said razor blade;

c. a first tab and a second tab coupled to said back edges of said first and second sidewalls, respectively, and adapted so that a person can hold said casing between his thumb and his second finger said tabs being bent downwardly and away from each other at an acute angle from said top edges; and

d. an elliptical plate coupled to said top edges of said adjoining sidewalls directly over the forwardmost part of said razor blade and disposed perpendicularly thereto and adapted to accommodate the first finger of the person so that a person can guide said cutting device with his first finger.

4,040,185

LADLE FOR SERVING SOUP

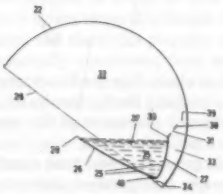
Jacob Jacobi, Simon van Capelweg 10, Noorden, Netherlands

Continuation-in-part of Ser. No. 557,823, March 12, 1975, abandoned. This application Feb. 19, 1976, Ser. No. 659,271

Claims priority, application Netherlands, Mar. 29, 1974, 7404355

Int. Cl.[2] A47J *43/28*

U.S. Cl. 30—326 **3 Claims**



1. A ladle for serving soup, comprising a substantially hemispherical bowl which has a circular edge and is provided with a handle, wherein the improvement comprises an inner boat-shaped receptacle which has a generally V-shaped cross-section, formed by two sides of the boat-shaped receptacle which meet at the bottom of the receptacle, which sides converge at both ends of the receptacle, and have edges which also converge at both ends of the receptacle, said receptacle being supported by the bowl in a generally inverted position relative to the bowl, with one side of the boat-shaped receptacle generally conforming to and slightly spaced from the inner surface of the bowl at one side of the bowl, the space between said side of the boat-shaped receptacle and the inner surface of the bowl forming a pouring passage extending from an inlet slot between the edge of such receptacle and the inner surface of the bowl to a discharge slot between the edge of the bowl and the bottom of such receptacle.

4,040,186

ORTHODONTIC PLIER-TYPE TOOL

Gerald J. Kalvelage, 7035 Rosemary, Dearborn Heights, Mich. 48128

Filed Oct. 1, 1973, Ser. No. 402,394

Int. Cl.[2] A61C *7/00*

U.S. Cl. 32—66 **1 Claim**

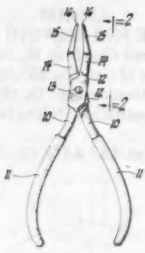
1. A plier-type tool for orthodontists for manipulating O-ring type elastic ligatures comprising:

a. a pair of plier members, each having a handle portion and a jaw portion;

b. said plier members being retained in a pivotal relationship by a pivot pin;

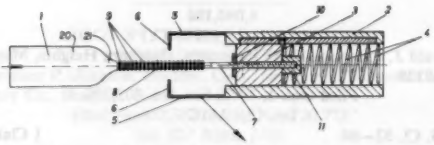
c. said plier members being movable between an open position and a closed position by manipulation of the handle portions of the plier members;

d. each of said jaw portions including a pivot portion, an intermediate portion and an outer end portion;
e. each of said outer end portions comprising a beak member having an inner face, with each of said beak members having a transverse groove formed along the inner face thereof, whereby an elastic ligature may be positioned lengthwise in said grooves and grasped between said beak members for manipulating said elastic ligature when the jaw portions are moved to the closed position;
f. each of said beak members having an identical pointed outer end configuration adjacent the transverse groove formed thereon and forming one-half of a total pointed tip formed by the beak members when in the closed position, whichwhen in the closed position facilitates the sliding



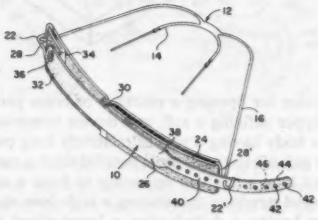
thereon of an elastic ligature for expanding the same preparatory to grasping the ligature by the beak members for manipulation and placement of the same in an operative position in a patient's mouth;
g. each of said grooves in said beak members having a concave transverse configuration that extends perpendicular to the longitudinal axis of each beak member and which coact together to form a transversely closed circular groove when the jaw portions are moved to the closed position to completely surround said ligature;
h. each of said beak members being disposed at an acute angle from a plane passing through the longitudinal axes of the handle portions; and,
i. said acute angle being an acute angle in a range up to and including 90°.

4,040,187
ORTHODONTIC ELASTIC INSERTER TOOL AND METHOD
Pedro Garcia Cardena, Avda. de Jose Antonio No. 54, Madrid, Spain
Filed Jan. 15, 1976, Ser. No. 649,456
Claims priority, application Spain, Feb. 13, 1975, 209927
Int. Cl.[2] A61C *7/00*
U.S. Cl. 32—66 **11 Claims**



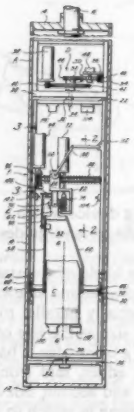
1. Orthodontic elastic inserter apparatus comprising:
a hollow sleeve having an opening;
piston means mounted and slidable within said sleeve, said piston means adapted to support storage means;
storage means attached at one end to said piston means and passing longitudinally through said opening, said storage means adapted to pass through said elastic rings;
a body attached to the other end of said storage means and having a tapered surface adjacent said storage means, said surface adapted to receive said elastic rings annularly, and
flexible clamp means, mounted to said sleeve and proximate said storage means, for engaging a selected one of said elastic rings on said storage means, whereby said selected elastic ring expands by movement of said tapered surface through said selected ring.

4,040,188
ORTHODONTIC NECK BAND INCLUDING SAFETY STRAP
Jacob J. Masel, 3021 Darnell St., Philadelphia, Pa. 19154
Filed Dec. 11, 1975, Ser. No. 639,757
Int. Cl.[2] A61C *7/00*
U.S. Cl. 32—14 D **15 Claims**



1. In an orthodontic device, the combination of
a face bow, said face bow comprising attaching terminals;
a resilient band attached to the face bow at at least one terminal,
said resilient band tensioning the face bow; and
a non-extensible band overlying the resilient band,
the non-extensible band being connected to the face bow to prevent movement of the face bow in a direction tending to extend the band.

4,040,189
METHOD AND APPARATUS FOR LEVELING AN INSTRUMENT IN A WELL BORE
Lucien J. B. LaCoste, Austin, Tex., assignor to La Coste and Romberg, Inc., Austin, Tex.
Filed Sept. 22, 1976, Ser. No. 725,543
Int. Cl.[2] F21B *47/022*
U.S. Cl. 33—304 **16 Claims**



1. A device for leveling an instrument comprising:

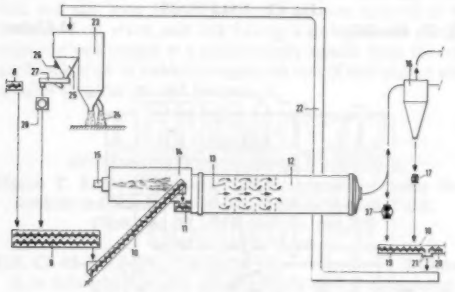
a housing having a dimension which is substantially longer than the housing dimensions normal to said long dimension,
a frame,
means for rotating said frame about a rotation axis substantially parallel to said long housing dimension,
an instrument having a reference axis which is to be positioned approximately vertical for good instrument performance,
means for tilting said instrument relative to said frame about two tilt axes substantially normal to said rotation axis and at an angle to each other,
one of said tilt means having a long range of tilt,
the other of said tilt means having a shorter range of tilt,
said instrument being mounted in said tilt means to align its reference axis parallel to said rotation axis when said long range tilt means is near one end of its range and when the short range tilt means is near the center of its range,
means for indicating the amount of tilt of said long range tilt means relative to said frame, and
leveling indicating means in fixed relation to said instrument to indicate when said instrument reference axis is vertical.

4,040,190

METHOD AND APPARATUS FOR DRYING MANURE OR MUD OR THE LIKE

Adriaan van den Broek, Zeist, Netherlands, assignor to W. van den Broek's Machinefabriek B.V., Driebergen, Netherlands

Filed Jan. 26, 1976, Ser. No. 652,416
Claims priority, application Netherlands, Nov. 11, 1975, 7513187
Int. Cl.[2] F26B *7/00*
U.S. Cl. 34—11 **5 Claims**



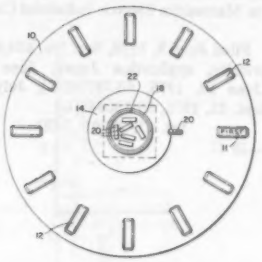
1. A process for drying a product, such as manure or mud and particularly sewerage mud, including the steps of passing said product to be dried through a preparation device to produce a prepared product suitable for introduction into a thermal drying device, thereafter passing said prepared product through a thermal drying device to produce a granular dried end product, and recycling at least a portion of said granular dried end product by returning and mixing said portion of said granular dried end product with said product being processed at a position in said process in advance of said thermal drying device, wherein the improvement in said drying process is comprised of the step of:
controlling the grain size of said granular dried end product by varying the grain size of the recycled portion of said granular dried end product through mechanical crushing of said recycled portion to a selected known grain size, and prior to drying, mixing the crushed recycled portion with said prepared product in a predetermined known amount.

4,040,191

EDUCATIONAL GAME

Eugene A. Quarrie, 7 Laurel Hill Place, Armonk, N.Y. 10504

Filed Oct. 1, 1975, Ser. No. 618,330
Int. Cl.[2] G09B *1/14*; A63F *9/00*
U.S. Cl. 35—1 **4 Claims**



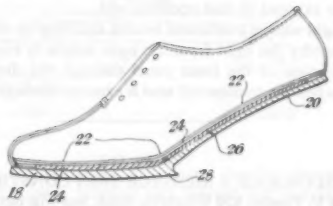
1. An educational game comprising a substantially planar support surface defining a substantially centrally located aperture, shaft means adapted to communicate with said aperture, said support surface adapted to rotate its own axis about said shaft means, platform means integral with said shaft means and disposed at one distal end thereof, a plurality of slotted channels disposed substantially equidistant from each other on a surface of said support surface, sleeve means open at at least one end thereof and disposed on said platform means, a hollow walled housing open at at least one end thereof and adapted to receive and concentrically engage said sleeve means, and a plurality of clip means containing printed matter thereon dispersed in said sleeve means, each of said clip means for selective clipped affixment to said platform means.

4,040,192

ATHLETIC TRAINING SHOE

Jose Miguel Perez, 7975 NW. 17th Terrace, Miami, Fla. 33155

Filed June 7, 1976, Ser. No. 694,025
Int. Cl.[2] A43B *23/00, 5/00*
U.S. Cl. 36—108 **4 Claims**



1. An improved athletic training shoe having an upper portion secured to a lower portion wherein the improvement comprising:
said lower portion being of unitary, one-piece construction and includes three distinct lower portion segments, a first segment having an end and a rearward extending surface for supporting the toes and the ball of the foot of a wearer, a second segment connected to said first segment and extending rearward for supporting a portion of the foot immediately behind the ball of the foot, and a third segment connected to the second segment and extending rearward to support the arch of the foot and the heel of the foot, said second segment adapted to position the first segment at an obtuse angle to said second segment and said third segment to prevent the third segment from

contacting a horizontal plane at the same time as said first segment contacts said horizontal plane.

4,040,193

DISPLAY DEVICE

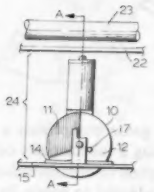
Isamu Matsuda, Yao, and Taizo Ono, Neyagawa, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed June 9, 1976, Ser. No. 694,488

Claims priority, application Japan, June 10, 1975, 50-78777[U]; June 10, 1975, 50-78778[U]; July 11, 1975, 50-97100[U]; Sept. 23, 1975, 50-130345[U]

Int. Cl.² G09F *7/00*

U.S. Cl. 40—28 C **5 Claims**



1. In a display device of the type having a display element with a surface including different colored areas, which display element is rotatably mounted opposite an opening of a front panel, and including means for controlling the rotational position of said display element to selectively expose a specified colored area through the opening of the front panel, the movement comprising:

the surface portion of said display element having a non-transparent area, a transparent area having a color different from the color of said non-transparent area, and a light passing portion which is positioned inside the front panel when said transparent area is exposed through the opening of the front panel, said light passing portion being optically connected to said transparent area and said nontransparent area having a size for completely covering said opening in the front panel when said non-transparent area is exposed to said opening; and

a light source positioned behind said display element,

whereby the light from the light source is scattered to the otuside of the front panel through the display element when the transparent area is exposed through the opening.

4,040,194

CHANGEABLE MESSAGE SIGN CONSTRUCTION

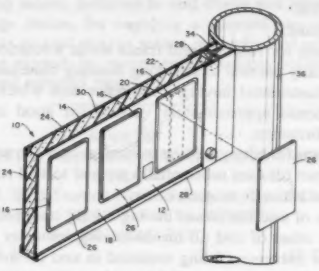
Hugh V. Penton, 850 Winthrop Road, San Marino, Calif. 91108; Gerald P. Dunphy, 1232 Laster Ave., Anaheim, Calif. 92803, and Clayton O. Stevens, 12626 Ocaso Ave., La Mirada, Calif. 90368

Filed July 28, 1976, Ser. No. 709,286

Int. Cl.² G09F *7/04*

U.S. Cl. 40—142 A **16 Claims**

1. In a changeable message sign construction, the combination of: generally horizontally spaced and generally vertically extending first and second face sheets, at least said first face sheet being formed of a magnetic force transmitting sheet metal and having a horizontally recessed message pocket debossed in an exterior face thereof; a magnet operably mounted on an interior face of said first face sheet positioned magnetically effective through said first face sheet within the confines of said message pocket and transmitting magnetic forces exteriorly through said pocket; a message plate formed at least partially of a magnetically attractable material selectively removably positioned at least partially recessed within said message pocket of said first face sheet retained against at



least generally horizontal displacement therefrom by said magnetic forces of said magnet.

4,040,195

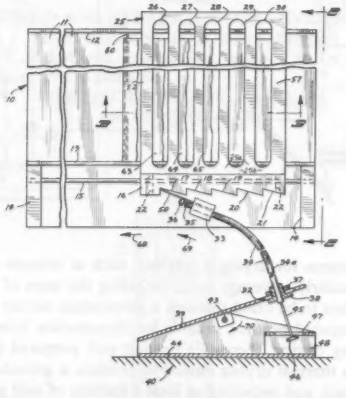
PAGE TURNER APPARATUS

James P. Claypool, Minneapolis, and Gerrit Hoogenraad, Minnesota Lake, both of Minn., assignors to Donald C. Delich, Minneapolis, Minn., a part interest

Filed Apr. 15, 1976, Ser. No. 677,279

Int. Cl.² B41J *11/38*

U.S. Cl. 40—341 **13 Claims**



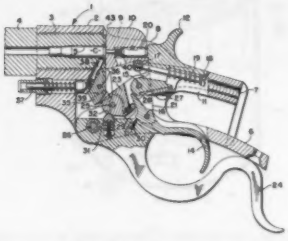
1. Page turner apparatus comprising a base for supporting a book in an open condition, a slide member for engaging and successively turning pages in the book; first means for mounting the slide member for translating movement on the base the slide member including a plurality of longitudinally extending, generally parallel finger portions for having a page extended between each adjacent pair of finger portions; said finger portions having first end portions; and second means joined to said first end portions of said finger portions for retaining the finger portions generally parallel and to simultaneously translate all of the finger portions as the slide member is moved to turn a page.

4,040,196

RIFLE

Jessop Smith, Gates Mills, and Thomas Robert Kocis, Streetsboro, both of Ohio, assignors to Triple-S Development Co., Inc., Wickliffe, Ohio

Filed May 17, 1976, Ser. No. 687,007
Int. Cl.[2] F41C *11/04, 15/08*
U.S. Cl. 42—23 **7 Claims**



1. A receiver for a single-shot rifle having a rifle barrel secured to said receiver and having a lever-activated falling block action; said action comprising a breech-block movable downwardly from a wedged firing position wherein a firing pin carried thereby is aligned with a cartridge in the rifle barrel to a cartridge loading position; a hammer and a trigger each pivotally connected to said block whereby, in said firing position of said breech-block, pulling of the trigger releases said hammer to strike said firing pin; a lever pivotally connected to said receiver and to one end of a link which has its other end pivotally connected to said block to form a toggle linkage to move said block downwardly from and upwardly to said wedged firing position responsive to swinging of said lever in opposite directions; said receiver having a slot from which said action including said firing pin, said hammer, said trigger, said link, and said lever is bodily removable upon removal of the lever-receiver pivot; said link having a spring-biased plunger engaging said trigger at a point radially spaced from the trigger-block pivot to yieldably engage an end of said trigger with a radial shoulder on said hammer.

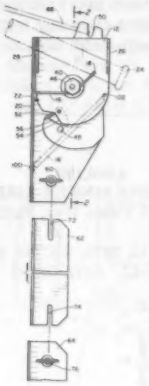
4,040,197

AUTOMATIC FISHING POLE HOLDER

Daniel T. Robbins, Burbank, Calif., assignor to Danny Joel Robbins and Stanley M. Brown, both of Newhall, Calif.

Filed Dec. 29, 1975, Ser. No. 644,377
Int. Cl.[2] A01K *97/10*
U.S. Cl. 43—15 **7 Claims**

1. A fishing rod holder and triggering device comprising:
a frame;
cradle support means rotatably attached to said frame for supporting a fishing rod, said cradle means comprising:
a flat plate;
means rotatably attaching said plate to said frame;
a pair of flanges extending outward from opposite edges of said plate;
cradling means in each flange for cradling a fishing rod;
biasing means for rotatably biasing said cradle support means;
trigger latching means for latching said cradle means in a biased position, said trigger latching means comprising;
a counterweighted plate secured to said frame beneath said cradle means;
a tang extending outward from said counterweighted plate;
a detent in the edge of said cradle means being engage and latched by the tang;
mounting means for pivotally mounting said trigger latching means at a point spaced from its center of gravity;
limiting means for limiting the rotational movement of said center of gravity so that said trigger latching means will automatically latch said cradle means after a predetermined amount of rotation, said limiting means comprising;
an arcuate slot in said counterweighted plate;
bearing means on said rotatably attaching means between the cradle means and frame;



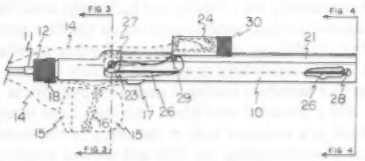
said bearing means passing through said arcuate slot for guiding said counterweighted plate; and
slot means on said trigger latching means for engaging a fishing line whereby a pull on said fishing line trips said trigger latching means, releasing said cradle means causing a sudden jerk on said fishing line.

4,040,198

BAIT CASTING DEVICE

Phillip M. Skibo, 1353 Thomas St., Green Bay, Wis. 54303

Filed May 3, 1976, Ser. No. 682,613
Int. Cl.[2] A01K *91/02*
U.S. Cl. 43—19 **3 Claims**



1. In a bait casting device including a handle adapted to support a rod from a forward end thereof and adapted to support a reel for forward feeding of a fishing line therefrom and for retraction of the fishing line, said handle member including a pair of elongated side wall members together defining a hollow generally tubular structure having a central longitudinal axis, a pair of elongated track members on an upper side of said handle and having a first pair of portions in parallel vertical planes on opposite sides of a central vertical plane through said longitudinal axis and having a second pair of portions in a horizontal plane transverse to said central vertical plane and projecting in opposite directions from said central vertical plane, a bait carrier mounted on said track members for longitudinal slidable movement therealong and including inwardly extending flanges for cooperation with said second pair of portions of said track members to retain said carrier on said track members during slidable movement therealong, means for securing said pair of side wall members of said handle together and for securing said track members thereto including fastening means extending transversely between said

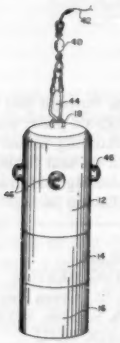
side wall members of said handle and through forward end portions of said track members, a pulley journalled on said fastening means for rotation about a horizontal axis in a plane transverse to said central vertical plane, and flexible band means secured at one end to said bait carrier and at an opposite end to the rearward end of said handle, said flexible band means being entrained on said pulley and having an upper portion extending between said first pair of portions of said track members and between said pulley and said bait carrier and having a lower portion extending rearwardly within said handle between said pulley and said rearward end of said handle.

4,040,199

FISHING LINE SINKER ASSEMBLY

George M. Raptis, 17876 Vicino Way, Pacific Palisades, Calif. 90272

Filed Mar. 15, 1976, Ser. No. 666,622
Int. Cl.[2] A01K *95/00*
U.S. Cl. 43—43.14 3 Claims



1. A sinker assembly for a fishing line including: a first member of substantial weight, means mounted on the first member for receiving the fishing line, at least one further member of substantial weight removably coupled to the first member, the first and second members having a generally cylindrical configuration; and a threaded stud fitted into one of the members to be received in a threaded hole in the other of the members for removably intercoupling the first and second members in which at least one of the members has protuberance means formed on the surface thereof to prevent the assembly from rolling.

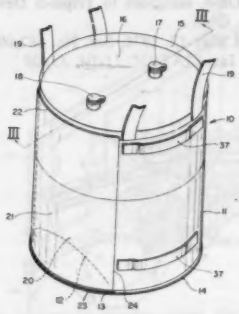
4,040,200

PORTABLE CONTAINER FOR FISH, LIVE BAIT, AND THE LIKE

Shuzo Tomita, 122-1 Tomonaka, Kyowa, Obu, Aichi, Japan

Filed Mar. 18, 1976, Ser. No. 667,999
Claims priority, application Japan, Mar. 20, 1975, 50-38069[U]; Mar. 20, 1975, 50-38070[U]
Int. Cl.[2] A01K *97/04*
U.S. Cl. 43—57 12 Claims

1. Apparatus for the transport of fish, bait or the like comprising a container having a body, a portion of which is formed with a contiguous double wall and having a bottom plate, a cover plate sealed therewith, the lower edge of the inner one of said double walls of said body being separate from the bottom plate, the upper edge of the outer one of said double wall being separate from the cover plate, said wall members being flexible



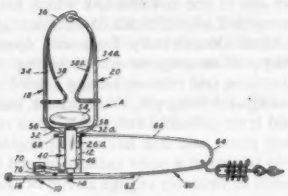
relative to each other to form a closable pocket allowing access to the interior of said container.

4,040,201

MULTIDIRECTIONAL ANIMAL TRAP

Kenneth R. Swanson, Rte. No. 1, Waverly, Minn. 55390

Filed May 4, 1976, Ser. No. 683,170
Int. Cl.[2] A01M *23/26*
U.S. Cl. 43—90 1 Claim



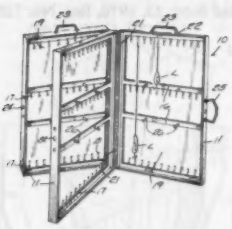
1. A multidirectional animal trap comprising:
a. a base including a circular ring having
b. spokes connected at the outer ends to the base ring and at the inner ends to
c. an elongated cylindrical hub mounted axially of said ring on said base,
d. at least three jaws pivotally mounted at the lower ends thereof in spaced slots formed in said hub and extending radially outwardly of the hub,
e. a spring carried by said hub and in engagement with said jaws to normally hold the same together in closed clamping relation including a lower leg connected at the outer end of said base and terminating at its inner end in
f. a bight which terminates in
g. an upper leg overlying said lower leg with
h. a ring formed on the outer free end of said upper leg through which said jaws extend and which urges said jaws into closed clamping condition,
i. a pressure plate,
j. means pivotally mounting said plate on said base,
k. means for releasably holding said jaws in open separated condition against the action of said spring includig a bar pivotally mounted on said base for clamping engagement with one of said jaws with
l. means for releasable engagement with
m. the edge of an opening formed in said means mounting said pressure plate so that pressure applied to said plate causes disengagement of said engagement means of said bar from said opening whereby said jaws are caused to pivot to closed clamping relationship.

4,040,202

FISHING TACKLE STORAGE CASE

Richard M. Wille, 15355 Kata Drive, Brookfield, Wis. 53005

Filed June 14, 1976, Ser. No. 696,043
Int. Cl.[2] A01K 97/06
U.S. Cl. 43—57.5 A 8 Claims



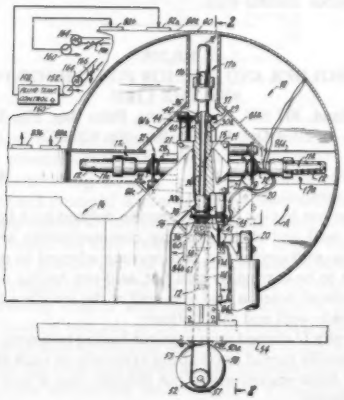
1. A case for the storage of fishing lures and the like comprising:
   a. an outer frame member;
   b. first attachment means mounting helical tension springs to the interior of said outer frame member, said first attachment means comprising a threaded stud for each spring having a pitch diameter approximately equal to the diameter of the spring;
   c. second attachment means on the interior of said frame member opposite said first attachment means; and,
   d. said tension springs each being demountably threaded by one of its ends to one of said threaded studs such that the opposite end of the spring is free, the first coil of the opposite end being opened to provide attachment for one end of a lure, whereby the other end of the lure may be attached to said second attachment means and held against displacement by spring tension.

4,040,203

ROTATING CORE RODS

John Jerome Farrell, Greenbrook, N.J., assignor to Consupak, Inc., Morristown, N.J.

Filed May 10, 1976, Ser. No. 684,668
Int. Cl.[2] F27B 9/14
U.S. Cl. 432—124 10 Claims



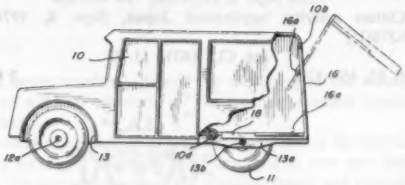
1. An apparatus for parison temperature distribution comprising, an indexing head being horizontally rotatable, a block mounted to said indexing head so as to be rotatable about an axis transverse to the axis of rotation of the head, a first plurality of cores rotatably mounted to said block, and a second plurality of core rods being rotatably mounted to said block, said pluralities of core rods being angularly disposed to each other, each of said core rods having a surface to support a parison, a chamber with temperature control means for conditioning parisons, with said pluralities extending into said chamber, and means to rotate said pluralities of core rods in the chamber.

4,040,204

VEHICLE BANK WITH CLOSURE RETAINED BY VEHICLE MECHANISM PORTION

Armand S. Zucker, Skokie, Ill., assignor to Callen Manufacturing Corporation, Melrose Park, Ill.

Filed June 1, 1976, Ser. No. 691,452
Int. Cl.[2] A63H 33/30
U.S. Cl. 46—2 7 Claims



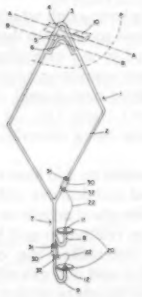
1. A miniature bank comprising a functional toy vehicle having a functional toy vehicle mechanism enabling conventional use of said vehicle, said vehicle having also a coin compartment, a closure for the latter which opens to permit the removal of coins, and a unit of the vehicle mechanism serving as a bar to the opening of said closure, said unit being independent of said closure and shiftable to release the closure.

4,040,205

SPINNING BALANCE TOY

Peter Taylor, Decatur, Ill., assignor to David V. Munnis, Champaign, Ill.

Filed Feb. 27, 1976, Ser. No. 661,957
Int. Cl.[2] A63H 1/32
U.S. Cl. 46—51 4 Claims



1. A spinning balance toy comprising a portable frame member adapted for manual rotation in a vertical plane about a horizontal axis, an opening in said frame having an axis which is coaxial to said axis of rotation of said frame, said frame opening thereby adapting said frame to be manually supported vertically by a member inserted into said frame opening, at least one pointed balance member, positioned fixedly to said frame, said pointed balance member being located on said frame at a point removed from said axis of rotation of said frame and having a terminus which, when said frame is supported in a vertical plane, extends upwardly and is truncated at

its end to define a horizontal surface, at least one target element, said target element having a bottom surface of larger cross-sectional area than that of said horizontal terminus of said pointed balance member and being adapted for removable slideable engagement with and for support by gravity upon said horizontal terminus of said pointed balance member, and a safety retaining means attached to said target element, said safety retaining means comprising a separate flexible line attached at one end to the upper surface of said target element and removeably attached at the other end to said frame.

4,040,206

BASE AND ROTATABLY MOUNTED DOLL WITH RELATIVELY MOVABLE PART

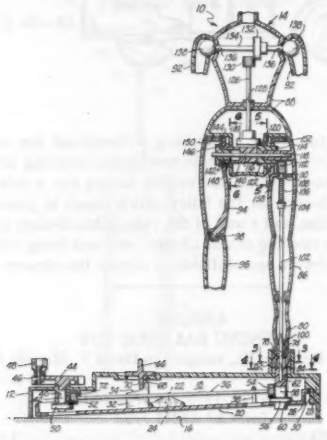
Osamu Kimura, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan

Filed Sept. 2, 1975, Ser. No. 609,204

Claims priority, application Japan, Sept. 4, 1974, 49-106378[U]

Int. Cl.[2] A63H *13/02*

U.S. Cl. 46—138 **9 Claims**



1. In the combination of a base, a doll which is articulated for relative movement of at least some parts thereof having a leg supported on said base and a rod extending from said base through said leg for use in transmitting motion to at least one relatively movable articulated part of said doll, the improvement which comprises:

said rod being a shaft and being rotatably mounted in said leg,

cooperating mounting means on said base and on said leg for holding said leg so that said doll can either be rotated as a unit relative to said base about an axis or so that said leg is held in a fixed position relative to said base,

adjustment means for controlling the operation of said mounting means so that said doll can either be given said rotation as a unit about an axis or so that said leg is held in said fixed position,

drive means for rotating said shaft located on said base,

coupling means for transmitting rotation from said drive means connecting said drive means to said shaft so that during the operation of said drive means said shaft is rotated, and

friction clutch means connecting said shaft with said doll for causing enough friction between said shaft and said doll to cause said doll to rotate as a unit when said adjustment means are used to control said mounting means so that said doll can be given said rotation as a unit,

said friction clutch means permitting said shaft to transmit motion to said articulated part of said doll when said adjustment means are used to control said mounting means so that said leg is held in a fixed position.

4,040,207

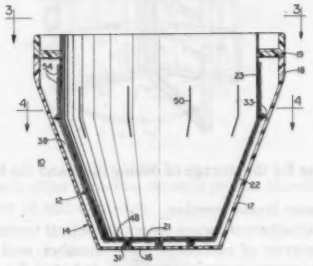
SELF-FERTILIZING POT

William R. Lancaster, 1157 Petersburg Road, Burlington, Ky. 41005

Filed Sept. 23, 1976, Ser. No. 725,778

Int. Cl.[2] A01G *27/00*

U.S. Cl. 47—80 **6 Claims**



1. A self-fertilizing pot which comprises an outer cup-shaped member, an inner cup-shaped member, means for attaching the cup-shaped members together with a space therebetween, timed release encapsulated plant food mounted on one of the cup-shaped members inside the space, and means for introducing water into the space to cause release of the plant food, there being opening means in the inner cup-shaped member to permit the water and plant food to enter the inner cup-shaped member to water and fertilize contents of the inner cup-shaped member, the inner cup-shaped member including a bottom plate, an annular wall extending upwardly from the inner member bottom plate, an annular trough bottom plate extending outwardly from an upper portion of the inner member annular wall, and an annular upright outer trough wall carried by the trough bottom plate, the outer cup-shaped member including a bottom plate and an annular wall extending upwardly from the outer member bottom plate, the means for attaching the cup-shaped members together including interacting detent means on the upright outer trough wall and the outer member annular wall.

4,040,208

PLANT HOLDER AND ANCHOR FOR ORCHID PLANTS AND THE LIKE

Fred England, 307 SW. Hardin Lane, Palm Bay, Fla. 32905

Filed Oct. 8, 1975, Ser. No. 620,547

Int. Cl.[2] A01G *9/02*

U.S. Cl. 47—67 **4 Claims**

1. In combination:

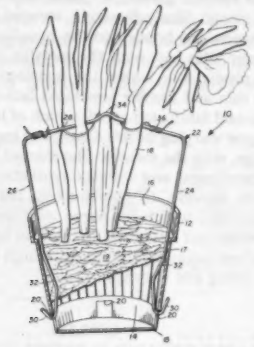
a flower pot having a cavity therein defined by a bottom, a side wall and a top opening communicating with said cavity, said cavity and said opening adapted to receive a plant to be carried by said pot, said pot having opposing peripheral holes in said side wall at the interface between said side wall and said bottom;

a generally U-shaped wire member having two arms with an outwardly turned hook at the extremity of each said arm, each hook engaging said pot through one of said peripheral holes;

a bend along each of said arms of said U-shaped wire member between the periphery of said top opening and said bottom for biasing the corresponding arm against the inside of said side wall of said pot; and

a bridging portion of said U-shaped wire member between said two arms thereof, said two arms having a dimension

so as to allow said bridging portion to extend above said top opening when said wire member is installed in said



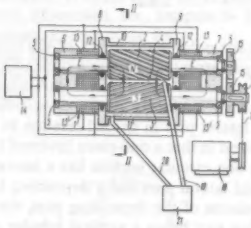
pot, whereby said plant therein.may be anchored to said bridging portion.

4,040,209

DEVICE FOR THE TREATMENT OF SHEET MATERIALS

Boris Nikolaevich Shikhirev, Novo-Alexeevskaya ulitsa, 1, kv. 146; Evgeny Arkadievich Matrosov, 2 Filevskaya ulitsa, 10/13, korpus 1, kv. 64, and Ilya Abramovich Deresh, Krasnokholmskaya Naberezhnaya, 1/15, kv. 343, all of Moscow, U.S.S.R.

Filed Nov. 6, 1975, Ser. No. 629,631
Claims priority, application U.S.S.R., Nov. 15, 1974, 2077025
Int. Cl.² B24B *7/12*
U.S. Cl. 51—80 A **4 Claims**



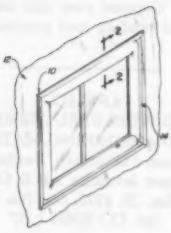
1. A device for treating sheet materials by a ferromagnetic abrasive powder comprising: a pair of cylindrical rolls of a magneto-conducting material adapted to rotate in opposite directions and arranged with a gap therebetween to enable the sheet being treated to pass between said rolls; said rolls having grooves formed on their external surfaces; means for feeding said abrasive powder into the gap between said rolls; means for inducing a magnetic field in the gap between the rolls so as to form a treating zone or area including a magnetic circuit located at least on one side of the ends of both said rolls so that the magnetic lines of the magnetic field pass along the axes of rotation of the rolls and cross the gap between them, so that said magnetic circuit and said rolls form a magnetic system wherein one roll constitutes one poll of the magnetic system and the second roll of said pair of rolls constitutes the other poll of the same system; the particles of said abrasive powder being retained in the zone of treatment by the action of the magnetic field of said system; a drive for rotating said rolls at substantially equal speed; and means for feeding the sheet material being treated into said gap between the rolls.

4,040,210

LOW COST STORM WINDOW

Edgel T. Land, 1733 S. Urban Way, Lakewood, Colo. 80228

Filed June 1, 1976, Ser. No. 691,463
Int. Cl.² E06B *7/16*
U.S. Cl. 52—2 **12 Claims**



1. A storm window adapted for mounting in the window frame of a house interiorly of the existing window closure, comprising:

a general planar marginal framework of sealed flexible tubing having a planform corresponding in size and shape to the size and shape of the window frame and provided with at least one inflation port to supply air under pressure to its interior to yieldingly enlarge its periphery and cause it to grip opposing areas of the window frame and retain it in predetermined position;

and closure means of thin flexible material extending across the framework at each side thereof and connected to it to form a hollow panel having a thickness substantially corresponding to the diameter of the tubing with substantially planar faces, and cooperating with the framework to define and enclose at least one substantially sealed dead air space to serve as insulation between the inner and outer walls of the panel;

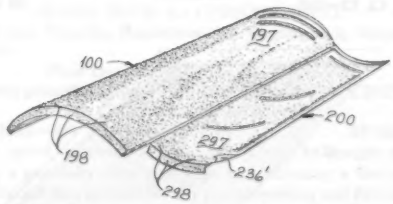
the closure means being substantially transparent to facilitate vision and light transmission through the panel.

4,040,211

MULTI PORTION TILE HAVING A CURLED INTERLOCK

John G. Wotherspoon, Anaheim, Calif., assignor to Martin E. Gerry, Santa Ana, Calif., a part interest

Continuation-in-part of Ser. No. 626,332, Oct. 28, 1975, abandoned. This application Apr. 22, 1976, Ser. No. 679,491
Claims priority, application Australia, Mar. 10, 1975, 0843/75
Int. Cl.² E04D *1/06, 1/08*
U.S. Cl. 52—100 **27 Claims**



1. A tile having arc-shaped portions, each of the portions being generally describable by an imaginary cylinder sliced by an imaginary plane parallel to a central axis coaxial with the walls of the cylinder, comprising in combination:

a first of said portions having convex and concave oppositely disposed surfaces;

a second of said portions, integral with the first of said portions, having concave and convex oppositely disposed

surfaces, the convex surface of the first portion and the concave surface of the second portion forming an outer surface of the tile, said second portion having a curled portion only at the approximate intersection of a first imaginary line describing one edge of the second portion to said axis with a second imaginary line perpendicular to said first imaginary line;

particulate matter disposed over said outer surface; and

a coating material binding said particulate matter to said outer surface.

4,040,212

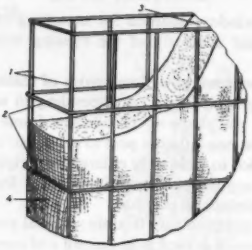
LATTICED WIRE STRUCTURE WITH A SOUND-ABSORBING MATERIAL

Per Staffan Göransson, Falkenberg, Sweden, assignor to Kommanditbolaget Pemac Invention AB & Co., Sweden

Filed Mar. 25, 1975, Ser. No. 561,715

Int. Cl.[2] E04B *1/82*

U.S. Cl. 52—145 **4 Claims**



1. A sound absorbing rectangular parallelepiped structure having 12 edges and being comprised of a wire lattice having sound absorbing material housed therein, said lattice having longitudinal wires and transverse wires which cross over each other at a plurality of locations, the longitudinal and transverse wires being fixedly interconnected to each other at at least a majority of said plurality of locations causing the structure to be inherently stable, a wire being located at each of said edges of the structure and the spacing between adjacent wires in at least one direction of said lattice being the same as the thickness of the structure.

4,040,213

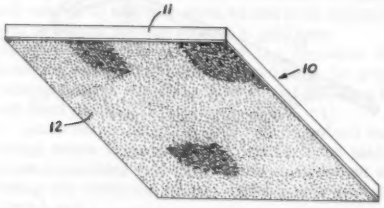
UNITARY STRUCTURAL PANEL FOR CEILING AND WALL INSTALLATIONS

Raymond W. Capaul, Rte. 3, Wildwood Drive, Aurora, Ill. 60544

Filed Aug. 22, 1975, Ser. No. 606,963

Int. Cl.[2] E04B *1/86, 1/94*

U.S. Cl. 52—145 **38 Claims**



1. A unitary structural acoustical panel for ceiling or wall installations which has large area dimensions, a dimensional stability and structural strength to be edge supported as a unit without sagging or warping, a high impact resistance, a high fire rating and easy washability, comprising in combination a relatively thick fabricated panel, which of itself may be subject to sagging or warping or impact damage or fire damage or soil damage, and a relatively thin and flexible laminated facing for said fabricated panel including a thin and flexible metallic film, a thin and flexible glass fiber scrim and a thin and flexible synthetic plastic film adhesively secured together with the scrim between and bonded to the metallic film and the synthetic plastic film and with the metallic film bonded to the synthetic plastic film within the openings in the scrim, said relatively thin and flexible laminated facing being adhesively secured to said fabricated panel, which of itself may be subject to sagging or warping or fire damage or impact fire damage or soil damage, with the metallic film thereof bonded to a face of the fabricated panel and with the synthetic plastic film thereof exposed to provide, in combination, the unitary structural acoustical panel which has large area dimensions, a dimensional stability and structural strength to be edge supported as a unit without sagging or warping, a high impact resistance, a high fire rating and easy washability.

4,040,214

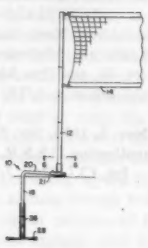
ADJUSTABLE GROUND SUPPORT FOR VOLLEYBALL POLES AND THE LIKE

Norman V. Frye, R.R. 4, Davenport, Iowa 52804

Filed Oct. 29, 1976, Ser. No. 736,779

Int. Cl.[2] E02D *5/74;* A45F *3/44*

U.S. Cl. 52—157 **10 Claims**



1. A support for poles and the like of the type including an inverted L-shaped structure having a depending part adapted to penetrate the ground and a lateral part adapted to overlie the ground and an upwardly directed pole-receiving means carried by the lateral part in spaced relation to the depending part, characterized in that a one-piece inverted L-shaped member of uniform non-circular section has a lateral leg constituting the aforesaid lateral part and a depending leg constituting one of two elements of the depending part, the other element of the depending part being a vertical tubular element of uniform non-circular section matching that of the depending leg and vertically telescopically and adjustably receiving said leg, means is provided for securing the tubular element and depending leg in any of several selected positions of vertical adjustment whereby to vary the extent to which the depending part penetrates the ground, and the pole-receiving means has a lateral opening therein of non-circular section and receiving the aforesaid lateral part.

4,040,215

DECAY-RESISTING CONSTRUCTION OF LOWER STRUCTURE FOR WOODEN BUILDINGS

Yasutaro Totsuka, Tokyo, Japan, assignor to Totsuka Komuten Co., Ltd., Tokyo, Japan

Filed May 20, 1976, Ser. No. 688,345

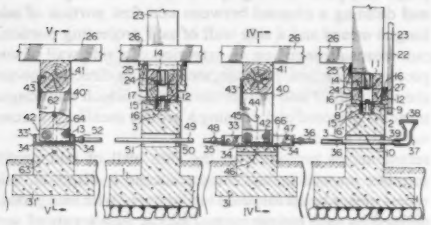
Claims priority, application Japan, May 26, 1975, 50-61939; June 23, 1975, 50-75633; June 4, 1975, 50-74836

Int. Cl.[2] E04B *1/92;* A01M *1/24*

U.S. Cl. 52—168 **8 Claims**

1. In a building construction having a continuous footing and a plurality of post-type footings, each of said footings having a

top face, and a wooden lower structure erected on the footings, the improvement wherein the top faces of the footings are provided with an upwardly opening groove therein, an upwardly opening tray positioned within the respective grooves accommodating therein a wood preserving and insecticidal liquid, said tray being formed by walls which are impervious to said liquid to prevent same from permeating into the footings, a plurality of pipes interconnecting the trays which are



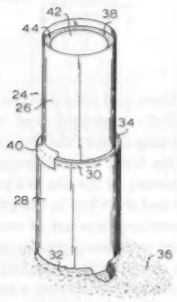
mounted on the different footings to permit transfer of said liquid between said trays, and suction material affixed to at least a portion of said lower structure, at least a part of said suction material being positioned within the trays and being in contact with the liquid therein, whereby said suction material sucks up the liquid in said trays and transfers same to said lower structure so that the liquid can permeate the lower structure to protect same.

4,040,216

PILLARS, WALLS AND BUILDINGS

Aristid V. Grosse, Haverford, Pa., assignor to A & T Development Corporation, Philadelphia, Pa.

Filed May 19, 1975, Ser. No. 578,931
Int. Cl.[2] E04B *1/00;* E02D *27/00*
U.S. Cl. 52—169.13 **10 Claims**



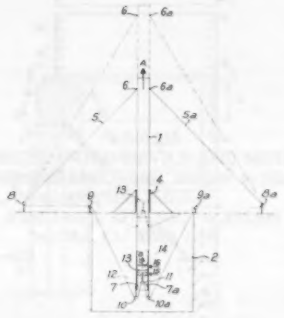
1. A structural member comprising at least one substantially smooth, linear tube, each tube comprising a material having sufficient tensile strength to retain a column of soil in pillar-like configuration, the tubular configuration having a waisted cross-section, each tube positioned substantially upright having an upper end and a lower end, a minor portion of each tube extending downward into the soil immediately surrounding the lower end of each tube, and a column of soil retained within each tube.

4,040,217

APPARATUS FOR ERECTING A MAST

Jean Cloup, Latresne, France

Continuation of Ser. No. 441,347, Feb. 11, 1974, abandoned.
This application Nov. 19, 1975, Ser. No. 633,262
Claims priority, application France, Feb. 22, 1973, 73.06354
Int. Cl.[2] E04H *12/18, 12/34*
U.S. Cl. 52—115 **9 Claims**



1. An apparatus for raising a vertical mast having an upper portion and a base, said apparatus comprising:

guy lines attached to the upper portion of said mast points of attachment thereon for balancing said mast, pulleys fixed to the earth for securing the guy lines to balance the mast, first means operatively connected to said guy lines for increasing the tension in said guy lines, second means operatively connected to the base of the mast for applying an upwardly directed force to the base of the mast derived from the tension in the lines that is capable of overcoming the weight of the mast and the downwardly directed force on the mast created by said tension at said points of attachment, said mast being raised upon the increase of tension in the lines by said tension increasing means so that said second means creates an upwardly directed force on said base that overcomes the weight of the mast and the downwardly directed force on said mast at said points of attachment due to said tension in said lines.

4,040,218

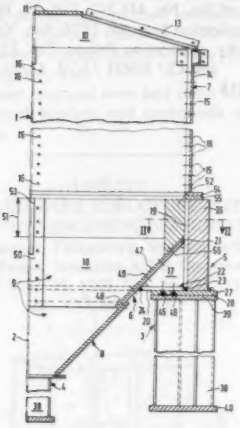
VESSEL WITH AN UPRIGHT SHELL

Karl-Heinz Stanelle, Rosenstrasse 4, Guglingen 2, Germany (7129)

Filed Dec. 17, 1976, Ser. No. 751,745
Claims priority, application Germany, June 18, 1976, 2627290
Int. Cl.[2] E04H *7/22;* B67D *5/06*
U.S. Cl. 52—194 **15 Claims**

1. A vessel, particularly a silo, comprising an upright shell having a generally circular outline and including a first part and a second part disposed below and supporting said first part, said second part having a collar including several arcuate sections extending circumferentially of said shell and abutting against each other in planes including the axis of said shell; means for securing the neighboring sections of said collar to each other, including an upright profiled bearing member for each of said planes, each of said bearing members having a relatively wide inner portion overlying the respective sections of said collar from without and a narrower outer portion, and means for fastening said inner portion to the respective sec-

tions, said fastening means forming two rows and said outer portion of each bearing member being disposed between the



respective rows of fastening means; and ground-contacting support means for said bearing members.

4,040,219

PROFILE ARRANGEMENT FOR WINDOW FRAMES OR DOORFRAMES

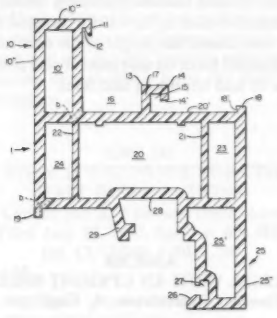
Wolfgang Budich, Troisdorf-Eschmar, Germany, assignor to Dynamit Nobel Aktiengesellschaft, Germany

Filed Nov. 3, 1975, Ser. No. 628,370

Claims priority, application Germany, Nov. 2, 1974, 2452087; Nov. 2, 1974, 2452089

Int. Cl.[2] E06B *7/14, 3/58*

U.S. Cl. 52—209 **67 Claims**



1. A frame arrangement, especially for doorframe and window frame construction comprising:

a profile member of hollow cross-sectional configuration formed by a plurality of interconnected side walls which surround and enclose a hollow space,

at least one outwardly projecting tongue means disposed on at least one side wall of the profile member at the center thereof for receiving at least one of a glass molding means and a sealing means, said tongue means includes a first portion extending outwardly from the side wall of said profile member, a second portion extending outwardly from said first portion substantially parallel to the side wall of said profile member and spaced therefrom, and a third portion extending from a second wall portion toward the side wall of said profile member, said third portion terminating in a free end spaced from the side wall of said profile member, said first, said second and said third portions defining a groove therebetween for receiving at least one of the glass molding means and the sealing means,

said profile member includes a projecting portion extending from the side wall on which said tongue means is disposed, said projecting portion being of hollow cross-sectional configuration formed by a plurality of interconnected side walls which surround and enclose a hollow space, said projecting portion being spaced from said tongue means and defining a channel between said first portion of said tongue means and a side wall of said projecting portion,

a cam means arranged on an extension of a side wall of said projecting portion, said cam means being directed toward the side wall of said profile member on which said tongue means is disposed and defining a groove means for accommodating a sealing element,

a recess means provided on the side wall of said profile member on which said tongue means is disposed, said recess means beind disposed in alignment with said groove defined by said tongue means, and at least a pair of web means disposed in the hollow space enclosed by the side walls of said profile member, said web means being spaced from each other and the side walls of the profile member such that the profile member includes a main chamber and lateral chambers disposed on each side of said main chamber, one of said lateral chambers accommodating the mounting of additional fittings, the other of said lateral chambers draining fluid from said channel.

4,040,220

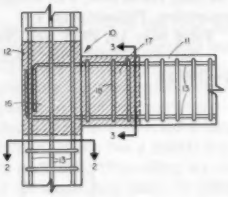
CONCRETE JOINTS

Charles H. Henager, Kennewick, Wash., assignor to Battelle Development Corporation, Columbus, Ohio

Filed July 25, 1973, Ser. No. 382,519

Int. Cl.[2] E04B *1/00*

U.S. Cl. 52—259 **6 Claims**



4. In a joint of beam and column-type members of the type comprising essentially concrete and intersecting elongate members of reinforcing steel or the like, confined with supporting members in the form of reinforcing hoops, stirrup-ties, supplementary crossties, or the like in a joint region, to provide sufficient strength and ductility in the joint to withstand satisfactorily a predetermined amount of reversed flexure the improvement of a joint possessing greater stiffness than the aforesaid joint through comprising in the joint region

a concrete mix with fibers having a modulus of elasticity of at least about 20 million psi substantially uniformly distributed therein with an average spacing between fibers of up to about 0.3 inch and in a quantity sufficient to provide at least a predetermined flexural strength, and

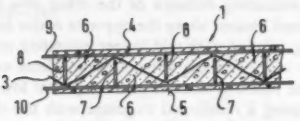
such intersecting elongate members and a number of said supporting members in the joint region less than are required to provide said sufficient strength and ductility with concrete not containing any such fibers, the quantity of said fibers in the joint region having less weight and volume than the omitted supporting members.

4,040,221

LOAD-BEARING CONCRETE MEMBERS PROVIDED WITH MOISTURE AND DAMP PROOF

Francoise Vermeulen-Amelot, 69, Avenue du Manoir, and Thierry F. Vermeulen, 17, avenue du Belier, both of Waterloo, Belgium

Filed Mar. 8, 1976, Ser. No. 665,158
Claims priority, application Germany, Mar. 7, 1975, 2510061
Int. Cl.[2] E04B *1/64;* E04C *2/32*
U.S. Cl. 52—265 12 Claims



1. A load-bearing concrete member, such as a beam, slab, shell, panel, wall, or like member, comprising

a single unitary piece of concrete having a pair of faces, a pair of lateral edge walls, and a pair of end walls,

reinforcing rods of steel embedded in said single piece of concrete, and

a moisture and damp proof, insulating, synthetic plastic foil sheet embedded in said single unitary piece of concrete and extending substantially over the entire area of said piece defined by said walls,

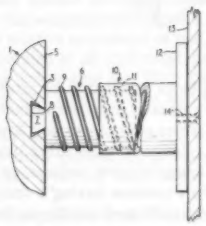
said foiled sheet being disposed in a corrugated pattern so as to extend to and fro from near one said face to near the other said face through substantially the entire thickness of the statically effective cross section of the concrete piece and so as to divide the concrete piece into roughly prismatic load-bearing elements each extending from one said end wall to the other of the concrete piece.

4,040,222

CAVITY WALL AND METHOD USING ADJUSTABLE SPACING DEVICES

Alan Sidney Cull, Cammeray, Australia, assignor to Civic & Civic PTY Limited, Sydney, Australia

Filed May 18, 1976, Ser. No. 687,607
Claims priority, application Australia, May 20, 1975, 1666/75
Int. Cl.[2] E04B *2/30*
U.S. Cl. 52—365 8 Claims



6. A cavity wall comprising:

a. a load-bearing masonry wall which is subdivided into a plurality of masonry units provided with slots, said slots being located on one side of said masonry wall;

b. a plurality of spacing devices rigidly held in said slots, each of said spacing devices comprising a threaded rod, an elastically deformable tongue on one end of the respective rod, and a cap in the region of the other end of the respective rod in threaded engagement therewith, said tongues being received in the respective slots under compression so as to be rigidly secured therein, and said caps having fixing surfaces which are spaced from said masonry wall and are aligned in a predetermined plane; and

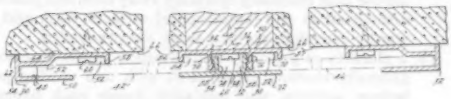
c. a skin connected with said fixing surfaces and defining a gap with said masonry wall, each of said rods having an exposed threaded portion in the region of said masonry wall so that moisture which penetrates said masonry wall and flows along said rods is caused to drip into said gap.

4,040,223

PANEL FRAMING DEVICE AND METHOD

David U. Hillstrom, Novi, Mich., assignor to Marketing Displays, Inc., Farmington Hills, Mich.

Filed June 1, 1976, Ser. No. 691,849
Int. Cl.[2] E04B *1/00*
U.S. Cl. 52—483 6 Claims



1. A panel framing device for attachment to a structure and for holding and displaying at least two panel members, said panel framing device comprising

a plurality of exterior framing sections forming a perimeter frame, each of said framing sections comprising an elongated channel for engaging and retaining a first edge of one of said panel members, recess means positioned adjacent said channel such that said recess means is covered by a panel member inserted in said channel, and projecting means adjacent said recess means for supporting and positioning said panel member in said channel a predetermined distance from the surface of said structure on which said panel framing device is attached,

at least one interior framing means positioned on said structure inwardly of said exterior framing sections, each of said interior framing means comprising a base member and a cover member, said base member havng a pair of outwardly extending spaced apart flange members having inwardly facing toothed portions thereon and a pair of outwardly extending projecting members for supporting said panel members, said pair of flange members forming a recess therebetween, said cover member having inwardly facing toothed flange members for mating and engaging with said first pair of flange members on said base member, said cover member covering said last-mentioned recess when installed in mating engagement with said base member,

said cover member and said base member forming a pair of elongated channels in said interior framing means for securely retaining a second edge of said panel members, said cover member adapted to securely mate with said base member and rest against one surface of said panel members,

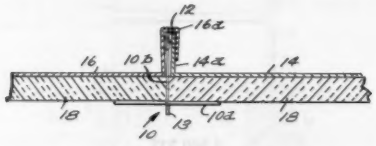
said pair of outwardly extending projecting members on said base member being substantially the same height as said projecting means on said exterior framing sections, said pair of projecting members and said projecting means positioning said panel members substantially parallel to the plane of said surface of said structure, and

fastening means disposed in said recess means in said exterior framing sections and in said recess formed in said base member in said interior framing means for securing said panel framing device to said surface of said structure.

4,040,224
ROOF INSULATION SUPPORT MEANS

Frank D. Harris, Homosassa Springs, Fla., assignor to Ralph D. Harris, Margarita, CanalZone

Division of Ser. No. 508,712, Sept. 23, 1974, abandoned. This application Jan. 8, 1976, Ser. No. 647,985
Int. Cl.[2] E04C 1/24
U.S. Cl. 52—509 4 Claims

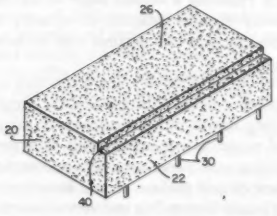


1. An insulated roofing assembly comprising
a. a plurality of sheet metal roofing panels forming a roof, each of said panels having a bottom generally flat surface, and each panel being joined to an adjacent panel at a joint, each joint including a portion of each roofing panel forming the joint extending upwardly away from and generally orthogonal to said bottom panel surfaces, each said upwardly extending portions being smooth-walled,
b. a plurality of generally flat insulation panels disposed in generally abutting engagement with said roofing panel bottom surfaces, said insulation panels each having a bottom surface generally parallel to the bottom roofing panels surface, and
c. means for readily removably retaining said insulation panels in engagement with said roofing panels so that said insulation panels may be readily assembled into engagement with said roofing panels and disassembled from engagement therewith, said means including a plurality of retaining members, each of said members comprising (i) a tongue portion inserted between the upstanding panel portions forming a joint between adjacent roofing panels, (ii) means formed on said tongue portion to provide sufficient withdrawal resistance of said tongue portion from said joint so that insulation panels may be supported by said retaining member while still allowing said tongue portion to be readily removable from said joint without damage to said joint or said tongue portion, (iii) a lip portion connected to said tongue portion and providing a support for an insulation panel by a utting the bottom surface thereof to hold said panel in engagement with a roofing panel bottom surface, and (iv) a withdrawal tab extending downwardly from said lip portion for aiding withdrawal of said tongue portion from a roofing panel joint in which it is disposed.

4,040,225
BUILDING BLOCK AND WALL CONSTRUCTION

Salvatore William Bretone, 34-41 85th St., Jackson Heights, N.Y. 11372

Filed Oct. 18, 1976, Ser. No. 733,388
Int. Cl.[2] E04C 1/10; E04B 5/04
U.S. Cl. 52—585 9 Claims

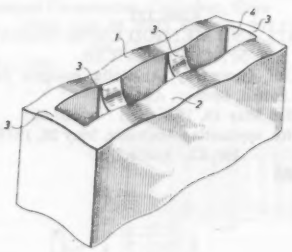


1. A wall construction composed of a multiplicity of rectangular building blocks bound together by cement mortar in an arrangement of staggered rows with each building block comprising; four minor side surfaces and two major surfaces, said two major surfaces being on opposite sides of one another with their longer dimensions disposed in a horizontal direction, a plurality of pins extending from one of said major surfaces and arranged in two equal rows each having an even number of pins with each row of pins aligned with the longer dimension in a plane perpendicular to the plane of said major surface and each row extending from said major surface, a distance unequal to the extending distance of the other row of pins, a recessed channel located along the opposite major surface in a corresponding relation with said longer extending row of pins such that the row of longer extending pins from each block extend into the recessed channel of the adjacent lower row of block for forming a reinforced structure with the channel of each row serving as a guide for the emplacement of each adjacent upper row of blocks to assure a true grade.

4,040,226
BUILDING BLOCK WITH WAVE-SHAPED UPPER AND LOWER SUPPORT SURFACES

Sven Evert Fernaeus, Frejavagen 80, 191 46 Sollentuna, and Erik Anselm Jonsson, Box 3411, Yckelsbo, 820 40 Jarvso, both of Sweden

Filed Aug. 18, 1975, Ser. No. 605,314
Claims priority, application Sweden, Aug. 23, 1974, 7410741; Sept. 3, 1974, 7411139
Int. Cl.[2] E04C 1/10
U.S. Cl. 52—594 3 Claims



1. A building block adapted to be arranged in substantially horizontal layers stacked upon each other, comprising:
substantially rectangular upper and lower support surfaces in parallel relative to each other over the whole of the upper and lower support surfaces, each of said upper and lower support surfaces having a continuous substantially sinusoidal wave-shaped profile in the length and width directions thereof at the same time, said length and width directions being substantially perpendicular relative to each other,
said continuous substantially sinusoidal wave-shaped profiles in both said length and width directions respectively extending over the complete surfaces of said upper and lower support surfaces, and said substantially sinusoidal wave-shaped profiles for the upper and lower support surfaces all having the same amplitude and periodicity and a constant wave profile over the whole of said upper and lower support surfaces such that the profiles of sectional surfaces through said block in either of said two directions is always substantially the same at all points in a respective direction.

4,040,227

METHODS OF MANUFACTURING BUILDING SECTIONS

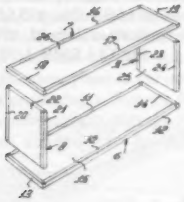
Cornelis van der Lely, Bruschenrain 7, Zug, and Hendricus Jacobus Cornelis Nieuwenhoven, Hirssattelweg, 6340 Baar, both of Switzerland

Continuation of Ser. No. 403,316, Oct. 3, 1973, abandoned. This application Aug. 4, 1975, Ser. No. 601,402

Claims priority, application Netherlands, Oct. 3, 1972, 7213328

Int. Cl.[2] E04B *1/35*

U.S. Cl. 52—745 5 Claims



1. A method of manufacturing a box-shaped space-enlosing prefabricated building section having dimensions compatible with and size for being transported on highways by transport vehicles, the method comprising the steps of performing the functions of:

making a floor panel, a wall panel and a top panel, said floor panel and said top panel each being provided with a framework of metal beams about its periphery;

providing metal beams at opposite vertical edges of said wall panel;

accurately incorporating permanently and immovably in the framework of said floor panel and also on the framework of said top panel a pair of spaced-apart extensions proximate the corners of each;

defining and accurately incorporating on the top end of said metal beams of said wall panel a pair of recesses corresponding to said pair of extensions incorporated in said top panel and defining and accurately incorporating on the bottom end of said metal beams of said wall panel a pair of further recesses corresponding to said pair of extensions incorporated in said floor panel, said extensions and said recesses being so shaped that when received together for accurately positioning the relative positions of said panels in the assembled section each individual extension and corresponding recess combination form a set which cooperate to restrict relative movement of said panels in which they are incorporated in all horizontal directions;

casting a concrete slab within said floor panel framework, providing filling materials between said beams said wall panel;

placing said bottom pair of recesses of said wall panel on said floor panel extensions and said top panel extensions in said top edge recesses whereby said panels are accurately positioned; and

rigidly fastening said panels by welding the framework of said floor panel and said top panel to said metal beams of said wall panel.

4,040,228

MOUNTING MEANS

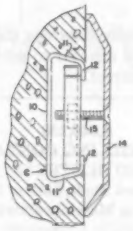
Leroy F. Skubic, La Porte, Ind., assignor to The Paltior Corporation, Michigan City, Ind.

Filed Feb. 12, 1976, Ser. No. 657,681

Int. Cl.[2] E04B *1/38;* E06B *1/16;* F16B *1/00*

U.S. Cl. 52—710 5 Claims

1. A mounting means for a plate such as a threshold having screw receiving apertures in accurately predetermined position comprising an upwardly opening mounting channel member having a web and side flanges extending at an angle to the web, an inturned margin extending along each flange, a downwardly opening channel shaped spanner bar of slightly greater length than the distance between the flanges of said mounting channel member, said channel shaped spanner bar having parallel flanges and being free of obstructions and of uniform dimensions between its flanges, said spanner bar having a screw receiving slot centrally of said web thereof and of a length to span the free edges of the inturned margins of the mounting channel opening, and a nut having parallel enlongated edges slidably and non-rotatably received in the downwardly opening channel of said spanner bar to prevent relative rotation between said nut and said spanner bar channel while permitting relative sliding between said spanner bar and said nut, and a bindingly fitting screw extending through an aperture in said plate and through said slot in said spanner bar and threaded into said nut, said screw being secureable through said plate such as a threshold to be secured to said mounting channel, whereby the assembled threshold plate and spannar



bar and nut and screw with the spanner bar in axial alignment with the channel opening of the channel mounting member can be positioned so the nut and spanner bar lie below the inturned margins so the first turning of the screw will cause the ends of the spanner bar to underlie the inturned margins of the mounting member as the spanner bar may slide on the nut whereby the ends of the spanner bar engage the flanges of said mounting channel member with a camming action so each end of the spanner bar may engage the adjacent flange of the mounting channel member and underlie the adjacent inturned margin of the channel member and further rotation of the screw positively rotates the screw relative to the nut and spanner bar and the nut and spanner bar are thereby moved along the screw and the arrangement clamps the plate such as a threshold when the ends of the spanner bar abut the undersurface of the inturned margins and the plate is secured in the accurately adjusted desired predetermined position to the support by the reaction of the spanner bar, screw, and nut with the mounting channel member.

4,040,229

METHOD OF MAKING A PACKAGE CONSTRUCTION FOR BASEBALL TYPE PLAYING COMPONENTS

James T. Candor, 5440 Cynthia Lane, Dayton, Ohio 45429, and Joseph V. Tassone, 2425 Rawnsdale Road, Kettering, Ohio 45440

Division of Ser. No. 481,776, June 21, 1974, Pat. No. 3,952,477, which is a continuation-in-part of Ser. No. 326,805, Jan. 26, 1973, Pat. No. 3,830,362, and a continuation-in-part of Ser. No. 320,206, Jan. 2, 1973, Pat. No. 3,819,038. This application Feb. 17, 1976, Ser. No. 658,102

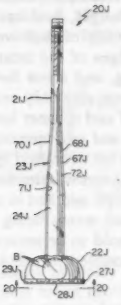
The portion of the term of this patent subsequent to Apr. 27, 1993, has been disclaimed.

Int. Cl.[2] B65B *5/04*

U.S. Cl. 53—29 10 Claims

1. A method of making of making a package construction comprising the steps of providing a tubular baseball and softball tee member having a chamber therein of a size to accommodate an entire bat of a conventional baseball or softball ballbat configuration and having a transition portion adapted

to be engaged by the conventional transition portion of said bat, providing a bat of a generally conventional baseball or softball ballbat configuration for hitting a ball off of said tee



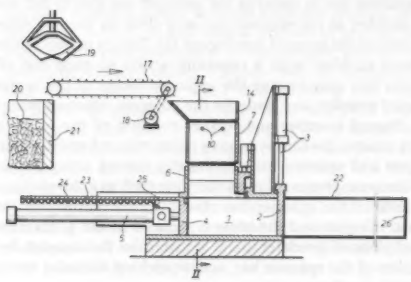
member, and telescopically disposing the entire said bat into said chamber of said tee member to provide a self-contained package construction thereof.

4,040,230

METHOD FOR FILLING CONTAINERS WITH COMPRESSED BLOCKS OF GARBAGE

Kurt Pessel, and Eberhard Stodt, both of Dusseldorf, Germany, assignors to Lindemann Maschinenfabrik GmbH, Dusseldorf, Germany

Filed Apr. 30, 1976, Ser. No. 682,160
Claims priority, application Germany, May 9, 1975, 2520573
Int. Cl.[2] B65B *63/02, 1/32*
U.S. Cl. 53—24 **7 Claims**



1. A method of compacting heterogeneous garbage into blocks and inserting a plurality of the compacted blocks into a container having a closable opening and having a filling space of predetermined length and a predetermined permissible load capacity, said method comprising:

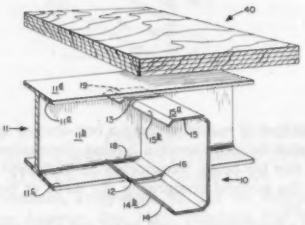
a. feeding a first quantity of garbage into a box;
b. weighing the first quantity of garbage feed into the box;
c. discharging the first quantity of garbage from the box into a compacting chamber;
d. compacting said first quantity of garbage in said compacting chamber based on the weight of the garbage into a first block of predetermined density, whereby the length of said first block is dependent on the weight characteristic of the garbage making up the block;
e. determining the length of said first block based on the length required to establish the predetermined density;
f. inserting said first block through said opening into the container;
g. repeating steps a) through e) with further quantities of heterogeneous garbage to form additional blocks of the same said predetermined density as said first block which further blocks are inserted into said container;
h. discontinuing the insertion of further compacted blocks into said container when the total length of all inserted blocks is sufficient for substantially filling the predetermined length of said container so that the closable opening can be inserted into the container without interference.

4,040,231

FRAMING SYSTEM

Joseph N. Laborde, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Continuation of Ser. No. 346,289, March 30, 1973, abandoned, which is a division of Ser. No. 173,029, Aug. 19, 1971, abandoned. This application July 22, 1974, Ser. No. 490,272
Int. Cl.[2] E04B *2/78*
U.S. Cl. 52—664 **5 Claims**



1. A framing system for a building or structure, comprising: a plurality of special structural connections; each of said special structural connections comprising, a special channel member and a special receiving structural member joined thereto; said special channel member having a pair of vertical legs extending substantially the length thereof and each joined to the base of the channel by an inclined corner wall, each of said channel member legs having leg portions formed on one end thereof by opposing cuts extending through said channel member vertical legs and said inclined walls, said cuts extending the height of said channel member vertical legs; said leg portions being bent toward each other; said special receiving structural member having a pair of legs extending substantially the length thereof, said structural member legs being spaced apart and having an opening therebetween, said opening being of a size sufficiently large for receiving said bent toward each other leg portions but sufficiently small for rejecting said channel member legs; said bendable leg portions of said special channel member being inserted in said opening between said legs of said special structural member in a tight frictional relationship without distortion in said structural receiving member; and, the external surfaces of said vertical legs of said special channel member being substantially flush with the external surfaces of said legs of said special structural receiving member, thereby providing a substantially flat surface for receiving a decking or sheathing member.

4,040,232

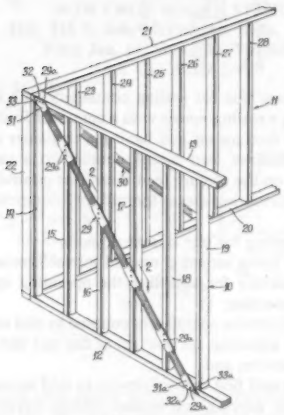
BUILDING BRACE

Kenneth T. Snow, 1303 N. Cross St., Wheaton, Ill. 60187, and Kenneth T. Snow, Jr., 317 Shagbark Court, Schaumburg, Ill. 60172

Continuation-in-part of Ser. No. 449,324, March 8, 1974, abandoned. This application Jan. 9, 1975, Ser. No. 539,701
Int. Cl.[2] E04C *3/32, 3/18*
U.S. Cl. 52—720 **1 Claim**

1. An elongated, relatively thin steel brace having both substantial compressive and tensile strengths for use in a building having a basic wall composed of vertically disposed spaced apart wood studs joined by a horizontal wooden bottom plate and a horizontal wooden top plate and capable of being carried

and handled by a person without substantial bending, and with the brace intended for attachment to the basic wall in a diagonal manner from the top plate, across a plurality of the vertical studs to the bottom plate without requiring notching of the top and bottom plates or the intermediately disposed vertical studs, said elongated brace comprising relatively flat portions at each end thereof with a plurality of holes therethrough to permit nailing of the flat end portions to the spaced apart top and bottom plates without any wood notching, said brace having a plurality of first portions disposed in spaced apart relationship longitudinally of said brace and between the flat ends for disposition of said first portions between the vertically disposed studs, stiffening ribs in each of said first portions, said ribs disposed generally longitudinally of the brace and projecting in one direction from the plane of said brace for disposition inwardly between the studs leaving the outside thereof generally flat and lying in the same plane as the outer plane surface of the studs, said ribs projecting a distance from the plane of said brace sufficient to substantially prevent compressive bending of said first portions, and said brace having other intermediate portions extending between the ends of said first portions for abutting each of the studs which the brace crosses, said intermediate portions being equal in number to the number of studs intended to be crossed by said brace, said intermediate portions being shaped in transverse cross section to render said intermediate portions in cooperation with said first portions and said flat end portions sufficiently stiff to permit carrying of said brace by a person without substantial bending and further to enable said intermediate portions to engage said studs in a substantially flat condition when said brace is secured to said basic wall with the ribs of said first portions extending inwardly of a plane including the outer edges of said basic wall, said portions having a plurality of nail holes provided therein, said intermediate portions of the brace shaped with extremely shallow stiffening ribs at the longitudinal side edges of said intermediate portions, said shallow stiffening ribs projecting in the same direction as said ribs of said first portions, said intermediate portions of said brace being curvilinear in cross section about the longitudinal axis of said brace to thereby define the extremely shallow side edge stiffening ribs.



4,040,233

METHOD OF OBTAINING A FILLED, FLUID BARRIER RESISTANT PLASTIC CONTAINER

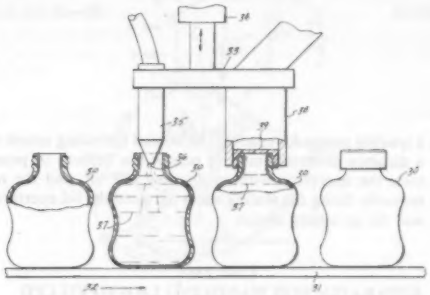
Emery I. Valyi, 5200 Sycamore Ave., Riverdale, N.Y. 10471

Continuation-in-part of Ser. No. 538,894, Jan. 6, 1975, Pat. No. 3,955,697, which is a continuation-in-part of Ser. No. 309,346, Nov. 24, 1972, abandoned, which is a continuation-in-part of Ser. No. 71,734, Sept. 14, 1970, Pat. No. 3,717,544, and Ser. No. 100,050, Dec. 21, 1971, Pat. No. 3,719,735. This application Mar. 17, 1975, Ser. No. 558,787

The portion of the term of this patent subsequent to May 11, 1993, has been disclaimed.

Int. Cl.[2] B29C *17/07*; B65B *55/06, 55/14*

U.S. Cl. 53—21 R **10 Claims**



1. A method for obtaining a filled, fluid barrier resistant plastic container wherein said container is exposed to a temperature in excess of 175° F. while retaining the barrier resistant characteristics thereof which comprises: preparing a seamless, multilayered, hollow plastic container having an open molded neck and having an outer pressure molded first portion of a thermoplastic material resistant to temperatures in excess of 175° F., an inner second portion of a thermoplastic material resistant to temperatures in excess of 175° F., and a third portion fluid barrier layer of a thermoplastic material between said first and second layers and co-extensive therewith throughout the extent thereof, said barrier layer having a lower temperature resistance than said first and second layers so that said container has the property that when exposed to an elevated temperature in excess of 175° F. but below the temperature resistance of said first and second positions said barrier layer softens or melts, but reforms in place upon cooling to retain its barrier resistant characteristics; filling said container through said open neck; exposing said container to an elevated temperature in excess of 175° F. but below the temperature resistance of said first and second portions followed be cooling the container to ambient temperature to utilize said property of the container and provide a filled, barrier resistant container.

4,040,234

METHOD AND DEVICE FOR RACKING AND SEALING CONTAINERS

Douglas P. Stockdale, Anaheim; Richard Mencarini, Hungtington Beach; Carlton D. Deaton, Garden Grove, and Ralph M. Owen, Laguna Hills, all of Calif., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Jan. 14, 1976, Ser. No. 649,079

Int. Cl.[2] B67B *5/00*; B01L *9/06*

U.S. Cl. 53—38 **22 Claims**

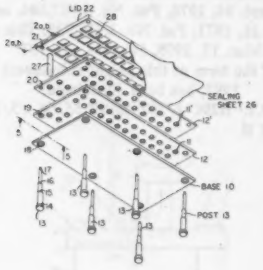
1. Rack for holding and sealing a plurality of containers having orifices, the rack comprising in combination:

a. mounting means for supporting and indexing a plurality of containers in predetermined substantially horizontally spaced relationship;

b. a lid opposite the mounting means at least one rigid sur-

face of which is broken with apertures, each aperture capable of receiving at least one of the orifices;

c. a flexible sheet for sealing the container orifices, said sheet disposed between the mounting means and the lid apertures; and



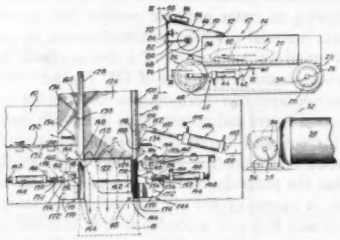
d. a spacing means for spacing the lid and mounting means at a distance predetermined to permit the orifices to penetrate the apertures without abutting the lid, and for removably fixing the sealing sheet between the lid apertures and the mounting means.

4,040,235

APPARATUS FOR HANDLING LIQUID FILLED FLEXIBLE POUCHES

Adam Chlipalski, 55th Avenue, Lachine, Quebec, Canada

Filed July 19, 1976, Ser. No. 706,604
Int. Cl.² B65B *57/20, 43/34*
U.S. Cl. 53—59 R **15 Claims**



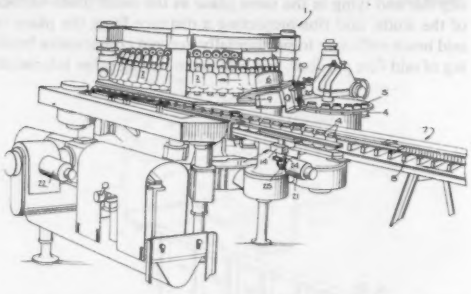
1. An apparatus for supplying a plurality of liquid filled flexible pouches into an outer flexible bag, the apparatus including means for advancing and feeding the plurality of flexible pouches one by one; a flexible pouch receiving cradle assembly having at least one support wall and a retractable bottom wall; means pivoting the cradle assembly between a first position whereby said support wall is inclined from the vertical below the angle of rest of said flexible pouches and adapted to receive a plurality of pouches fed from the advancing means stacked in side-by-side relation in the cradle assembly and a second position wherein said support wall is above the angle of rest of said pouches, means adapted to retract said bottom wall when the cradle assembly is in said second position, means below and adjacent said bottom wall when said cradle is in said second position for opening and locating an outer flexible bag for receiving the pouches as the pouches are dropped simultaneously from the cradle assembly, the advancing and feeding means including a conveyor belt supported by at least two conveyor belt support structures; a clutch arrangement operatively connected to one of the belt support structures and a source of power operatively connected to another of the support structures, the clutch arrangement adapted to move its respective support structure between a first position wherein the at least two support structures permit movement of the conveyor belt and a second position wherein movement of the conveyor belt is prevented, the support structure connected to the source of power being in motion before the clutch arrangement is advanced into the first position whereby immediate delivery of pouches by means of the conveyor belt is obtained upon actuation of the clutch arrangement to the first position.

4,040,236

MEANS FOR COMPENSATING CONTAINER FEED TRIP FOR SPEED CHANGES

Harold L. Siler, Jr., Rockbridge, and Cecil P. Roberts, Carroll, both of Ohio, assignors to Anchor Hocking Corporation, Lancaster, Ohio

Filed Jan. 21, 1976, Ser. No. 651,060
Int. Cl.² B65B *57/02, 57/08*
U.S. Cl. 53—67 **10 Claims**



1. In a sealing machine for sealing containers with closure caps and including a sealing means with a container feed means and a closure cap feed means and having a container sensing device on the container feed means coupled to a cap stop device positioned on the closure feed means for controlling it, an improved synchronizing means for said feed comprising the combination of:

a movable mounting for one of said devices;

said one device being mounted on said movable mounting;

a first control device for adjusting the operating speed of said sealing machine;

a second control device operatively coupled to said movable mounting for adjusting the position of the said one device positioned thereon; and

means coupling said first control device to said second control device for moving said second control device in response to movement of said first control device whereby said one device is moved in accordance with adjustments of the machine speed under the control of said first control device.

4,040,237

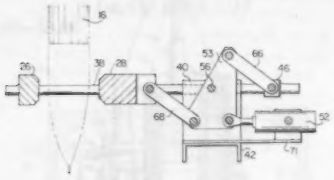
SEALING JAW MECHANISM FOR PACKAGE MAKING MACHINE

Edward F. O'Brien, Northhampton, Mass., assignor to Package Machinery Company, East Longmeadow, Mass.

Filed June 18, 1976, Ser. No. 697,626
Int. Cl.² B65B *9/10*
U.S. Cl. 53—180 M **13 Claims**

1. In a package making machine, the combination of front and rear sealing jaws and a mechanism for moving said jaws relative to one another between open and closed conditions, said mechanism comprising a base, a slide supported for sliding movement relative to said base along a given axis, means fixing said front jaw to said slide for movement therewith, means slidably supporting said rear jaw for sliding movement relative to said slide along said given axis, said slide extending along said given axis from said front jaw toward and beyond said rear jaw to a point behind said rear jaw, two crank arms fixed relative to one another and supported for pivotal movement in

unison about a crank axis generally perpendicular to said given axis and located behind said rear jaw, a first connecting link connected between one of said crank arms and said slide with its point of connection to said slide being located behind said rear jaw, and a second connecting link connected between the other of said crank arms and said supporting means for said



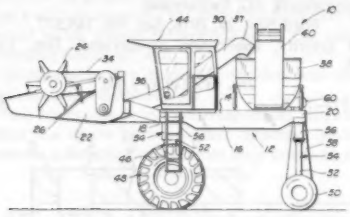
rear jaw, the point at which said first connecting link is connected to said one crank arm and the point at which said second connecting link is connected to said other crank arm being located generally on opposite sides of said crank axis so that upon rotation of said crank arms about said crank axis said two jaws are slidably moved in opposite directions along said given axis.

4,040,238

ROW CROP ROGUE VEHICLE

Fred L. Hill, 516 S. Ash, McPherson, Kans. 67460

Filed Jan. 14, 1976, Ser. No. 648,933
Int. Cl.² A01D *23/00*
U.S. Cl. 56—167 **2 Claims**



1. A row crop rogue vehicle for removing seed heads from weeds or the like which are taller than cultivated crops in a field, the vehicle comprising:

a vehicle frame having a top portion, bottom portion, front portion, and rear portion;

a front pair of hydraulic cylinders and a rear pair of hydraulic cylinders, said cylinders having an upper portion and lower portion, the upper portion of said cylinders attached to the bottom of said frame;

a pair of front wheels and a pair of rear wheels, said wheels rotatably attached to the lower portion of said cylinders;

a cutting sickle attached to the front of said frame for cutting the seed heads;

a rotary reel attached to the front portion of said frame;

an auger attached to the front of said frame, said rotary reel feeding the cut seed heads to said auger;

an endless chain driven ribbed conveyor mounted on the top portion of said frame and disposed adjacent said auger for receiving the cut seed heads from said auger;

a storage hopper mounted on the top portion of said frame and positioned at the rear portion of said frame for receiving and storing the cut seed heads from said conveyor;

a vehicle motor mounted on the top portion of said frame, said motor attached to and driving said wheels, said conveyor, said cutting sickle, said rotary reel, and said auger by a mechanical linkage;

a hydraulic drive motor mounted on the top of said frame and driven by said vehicle motor and connected to said hydraulic cylinders for raising and lowering said cylinders thereby raising and lowering said vehicle frame above the cultivated crops; and

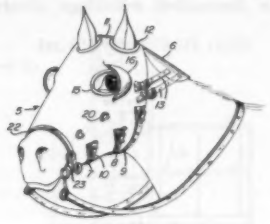
steering means mounted on the top portion of said frame and attached to said wheels for guiding said wheels between the rows of the cultivated crops.

4,040,239

PROTECTIVE HEADGEAR FOR HORSES

Kenneth W. Powell, Sweetwater, Tex., assignor to Charles G. Powell, Sweetwater, Tex., a part interest

Filed Apr. 6, 1976, Ser. No. 674,663
Int. Cl.² B68C *5/00*
U.S. Cl. 54—80 **8 Claims**



1. Protective headgear for horses comprising: means for substantially covering the complete head of a horse except for the ears, eyes, mouth and nose portions, including; a face mask of configuration to substantially conform to the head of a horse, the face mask as viewed from the side having a slightly convexly curved upper edge, a narrow lower edge and side edges converging from the top to the bottom edge, a pair of spaced openings near the top edge and spaced on each side thereof to receive the ears of the horse, a pair of farther apart spaced eye openings, one at each side of the face mask to accommodate the eyes of the horse, eye blinder cups secured to the outer edge of the eye openings, a protective flap member for the poll and neck of the horse hinged to the face mask at its upper rear edge, both the face mask and the protective flap member being lined with a soft protective padding, means for securing the face mask beneath the jaw of the horse, and further means for adjustably securing the side edges of the protective flap member to the rear side edges of the face mask.

4,040,240

METHOD AND APPARATUS FOR DOUBLING AND TWISTING A YARN BY A TWO-STEP CHANGEOVER SYSTEM

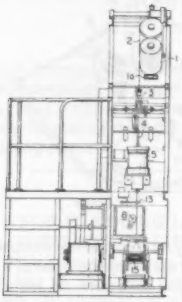
Kotaro Fujioka, Nagoya; Osami Tsuchihashi, Okazaki; Tetsuhiko Endo, Kyoto, and Masakazu Hirota, Shiga, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Filed Aug. 12, 1976, Ser. No. 713,851
Claims priority, application Japan, Oct. 8, 1975, 50-120578
Int. Cl.² D01H *1/08*
U.S. Cl. 57—34 CP **21 Claims**

1. A method for doubling and twisting a material yarn by a two-step changeover system by means of a pot twisting and winding device, wherein said material yarn is fed into said pot by way of a traverse tube being reciprocally displaced upwardly and downwardly along an axial center of said pot during a first step operation so that a yarn package of a primary twisted yarn created from said material yarn is formed upon an inside cylindrical wall of said pot, upon completion of forming said yarn package of said primary twisted yarn, a second step operation starts in which said primary twisted yarn is unwound from said yarn package so as to double with said material yarn supplied through said traverse tube while eliminating the primary twists imparted thereto, and said doubled yarn is twisted

simultaneously to said doubling operation; and, during the second step operation, upon completion of unwinding of said primary twisted yarn from said yarn package formed in said pot, said second step operation is stopped and said first step operation is commenced again, said first step operation and second step operation being alternately carried out, and changeover from the first step to the second step being controlled such that a bottom end of said traverse tube in said pot is at a position defined by $D_2 \geqq L_2$ wherein D_2 represents an innermost diameter of said yarn package formed in said pot by said first step operation while L_2 represents a distance between said bottom end of said traverse tube and an upper terminal of an aperture formed from a bottom inside surface of said pot.

9. An apparatus for doubling and twisting a material yarn by a two-step changeover system comprising a pot twisting and winding device provided with a traverse tube disposed therein



in a condition capable of traversing upwardly and downwardly along an axial center thereof, said pot being provided with an aperture formed from a bottom inside surface thereof, a mechanism for feeding a material yarn into said pot by way of said traverse tube, a mechanism for taking up a doubled and twisted yarn composed of said material yarn and a yarn unwound from a yarn package of primary twised yarn, formed on an inside cylindrical wall by a first step operation, from said operature of said pot during a second step operation, means for traversing said traverse tube along said axial center of said pot during said first step operation, and means for controlling the position of a bottom end of said traverse tube during said second step operation in a condition satisfying a relation $D_2 \geqq L_2$, where D_2 represents an innermost diameter of said yarn package formed in said pot by said first step operation, and L_2 represents a distance between said bottom end of said transverse tube and an upper terminal of said aperture.

4,040,241

DEVICE FOR DISTRIBUTING SOFTENING LIQUID ON THE YARN DURING THE TWISTING PROCESS

Claudio Speranzin, Pordenone, Italy, assignor to Officine Savio, S.p.A., Udine, Italy

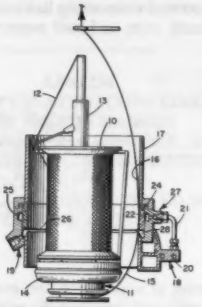
Filed Dec. 12, 1975, Ser. No. 640,155

Claims priority, application Italy, Dec. 12, 1974, 83450/74

Int. Cl.[2] D01H *13/30, 7/86*

U.S. Cl. 57—35 **15 Claims**

1. A device for distributing softening liquid to a yarn, when the yarn is being balloon twisted and has emerged from a spindle or core of the spindle including a container for the balloon, at least one chamber integrally fixed to an external portion of the container wherein the balloon slides, at least one feeding means for supplying liquid to said chamber and at least one porous seepage septum which is present as an inner sliding



surface for the balloon, said chamber being feedable with liquid under adjustable pressure.

4,040,242

TWIST TUBE FOR FALSE-TWISTING DEVICES

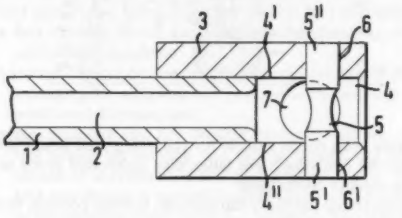
Josef Raschle, Butschwil, Switzerland, assignor to Heberlein Maschinenfabrik AG, Switzerland

Filed Nov. 29, 1976, Ser. No. 745,577

Claims priority, application Switzerland, Dec. 11, 1975, 16091/75

Int. Cl.[2] D02G *1/06*

U.S. Cl. 57—77.3 **3 Claims**



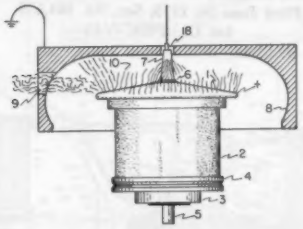
1. A twist tube for a false-twist device for texturing textile yarns, comprising a main tubular portion, a diametrally enlarged tubular portion constituting a comparatively short extension of one end of said main tubular portion, said enlarged tubular portion providing a widened continuation of the passage through said main tubular portion and having a bore extending from said one end to the extremity of said twist-tube, said bore being uniformly oblong in cross-section with major and minor axes perpendicular to one another and with parallel sides perpendicular to the minor axis of said cross-section, said enlarged tubular portion being formed on opposite sides with spaces for receiving respectively the ends of a thread-guide pin and opening into said parallel sides of said bore, and a cylindrical thread guide pin having its ends fitted and fixed in said spaces with the axis of said pin perpendicular to the major axis of said bore, said major and minor axes being substantially longer than the diameter of the passage through said main tubular portion and being dimensioned and disposed to facilitate the threading of yarn passing through the twist-tube and wound once round said pin.

4,040,243

ELECTRODES FOR ELECTROSTATIC FIBER COLLECTING AND SPINNING APPARATUS

Heber W. Weller, Jr., Metairie, La., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed July 19, 1976, Ser. No. 706,978
Int. Cl.[2] D01H *1/12*
U.S. Cl. 57—58.89 9 Claims



1. In a yarn spinning apparatus of the type comprising a stationary electrode, a rotatable electrode spaced from the stationary electrode and means connected to said electrodes for establishing and maintaining an electrical field between them, and said stationary electrode having an opening axially aligned with the rotatable electrode through which the formed yarn is withdrawn, the improvement characterized by:

a. a stationary electrode which

1. substantially encloses the rotatable electrode by extending, in a direction parallel to the axis, at least to the plane of the greatest diameter of the rotatable electrode,
2. has a surface opposing the rotatable electrode which is round in all planes perpendicular to the axis of the rotatable electrode, and
3. is positioned so that its axis is coincident with the axis of the rotatable electrode, and

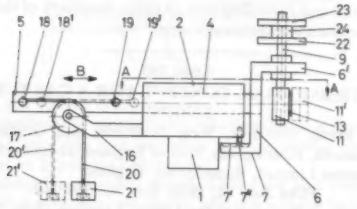
b. the two electrodes being a corresponding size and shape so that the space between their opposing surfaces increases in a direction radial from their common axis.

4,040,244

APPARATUS FOR FALSE-TWIST TEXTURING OF TEXTILE YARNS

Josef Raschle, Butschwil, Switzerland, assignor to Heberlein Maschinenfabrik AG, Switzerland

Filed Aug. 2, 1976, Ser. No. 710,418
Claims priority, application Switzerland, Aug. 19, 1975, 10793/75
Int. Cl.[2] D02G *1/04*
U.S. Cl. 57—77.45 6 Claims



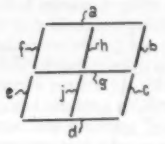
1. In apparatus for the false-twist texturing of textile yarns, a driving belt mounted to travel along a predetermined path during the operation of the machine, a fixed holder element formed with a guide passage, a rod guided in said passage so as to be slidable in opposite axial directions therethrough, said passage and rod being positioned so that one end of said rod is presented towards said belt, a support member fixed to said end of said rod and formed with two axially parallel bores extending therethrough in a plane to which said rod is perpendicular, two shafts respectively extending through and being rotatably mounted in said bores, driving rolls respectively mounted on said shafts in positions so to be driven by said belt when said rod is pulled in a direction to force said rolls against said belt, two rotation elements respectively mounted on said shafts for imparting rotation to means for false-twisting textile yarns, and means for imparting a constant, adjustable force to said rod to maintain a corresponding constant pressure between said rolls and said belt.

4,040,245

ELECTRONIC WATCH

Fernand Chetelat, Cortaillod, Switzerland, assignor to Ebauches S.A., Neuchatel, Switzerland

Filed Apr. 2, 1976, Ser. No. 672,971
Claims priority, application Switzerland, Apr. 25, 1975, 5362/75
Int. Cl.[2] G04B *19/00, 19/24*
U.S. Cl. 58—4 A 5 Claims



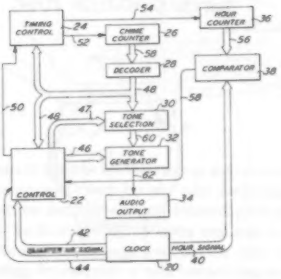
1. An electronic watch having an alpha-numeric display comprising, in addition to counter-dividers adapted to indicate seconds, minutes, hours and date, at least one counter adapted to provide a display in the form of letters of the alphabet, and several encoding means, associated with the said at least one counter, each of the encoding means, being adapted to a particular language and being selectively actuatable by means of a control terminal.

4,040,246

TIMEPIECE WITH ELECTRONIC CHIME GENERATOR

Egon Gorsky, 306 W. Dudley Ave., Westfield, N.J. 07090, and Morse Minknow, 1055 Grand Concourse, Bronx, N.Y. 10452

Filed June 19, 1975, Ser. No. 588,443
Int. Cl.[2] G04C *3/00;* G04B *21/08;* G08B *3/00*
U.S. Cl. 58—23 R 14 Claims



1. An electronic tone generator system for generating sequences of tones in accordance with the time of day, said system including a timepiece having output means for providing a coded signal representative of the time, means responsive to said output means for generating a sequence of electronic tones each time said means responsive is activated, said means responsive being activated each quarter hour, said tones being converted to a sound which is an audible representation of the time said chime generator generating a first sequence of tones

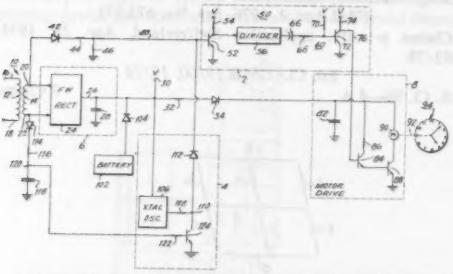
at the first quarter hour, a second sequence of tones at the second quarter hour, a third sequence of tones at the third quarter hour and a fourth sequence of tones at the hour, said generator further generating a chime of a different tone than the previous tones at the hour for each hour of the day past 12 o'clock.

4,040,247

CLOCK DRIVE APPARATUS

Arthur W. Haydon, Middlebury, Conn., assignor to Tri-Tech, Inc., Waterbury, Conn.

Filed Dec. 2, 1975, Ser. No. 637,026
Int. Cl.[2] G04C *3/00, 13/04;* H02M *7/00*
U.S. Cl. 58—23 R **22 Claims**



1. Apparatus for driving a time indicator device from an AC power source, comprising voltage supply means including a rectifier circuit for receiving a voltage from said AC power source to produce a DC energizing voltage and a capacitor coupled to the output of said rectifier circuit for storing and maintaining said DC energizing voltage thereacross immediately following an AC power source failure; oscillator means normally energized by said DC energizing voltage to produce periodic timing pulses; an auxiliary DC source; means responsive to said failure of said AC power source for supplying the voltage produced by said auxiliary DC source to energize said oscillator means, and utilization means for receiving said periodic timing pulses and for providing an indication of time.

4,040,248

ALARM ELECTRIC WATCH

Claude Laesser, La Chaux-de-Fonds, Switzerland, assignor to Ebauches S.A., Neuchatel, Switzerland

Filed Oct. 2, 1975, Ser. No. 618,824
Claims priority, application Switzerland, Oct. 11, 1974, 13687/74
Int. Cl.[2] G04C *21/28, 21/34*
U.S. Cl. 58—38 R **5 Claims**

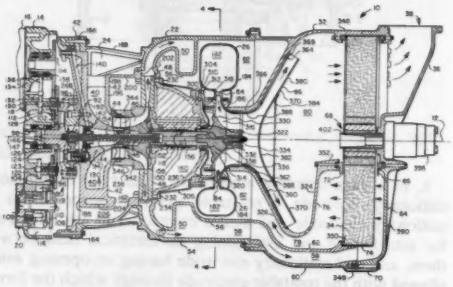
1. An alarm electric watch having an electro-optical display for the time and an alarm mechanism, said watch having a selecting device for the time at which the alarm is released, said time-selecting device comprising a manually displaceable element movable carried by a support element of said watch, one of said elements having an electrically conducting zone, a plurality of electrically conducting members associated with the electronic circuit of the watch carried by the other of said elements such that upon movement of said displaceable element a different combination of said conducting members makes contact with said conducting zone at each position of said displaceable element, each of said combinations of conducting members determining the time at which said alarm is released.

4,040,249

SINGLE SHAFT GAS TURBINE ENGINE WITH AXIALLY MOUNTED DISK REGENERATOR

Glenn W. Kahle, Waterloo, and Sydney A. Olsen, Cedar Falls, both of Iowa, assignors to Deere & Company, Moline, Ill.

Filed June 24, 1975, Ser. No. 589,679
Int. Cl.[2] F02C *7/10*
U.S. Cl. 60—39.51 H **16 Claims**



1. In a single shaft gas turbine engine having a single stage compressor disposed for rotation about a central axis and discharging high pressure gases, having a single stage radial flow turbine disposed axially forward of the compressor for rotation about the central axis which discharges exhaust gases in an axially forward direction and which is coupled to drive the compressor, and having a disk regenerator disposed axially forward of the radial flow turbine for rotation about a regenerator axis which is parallel to the central axis, the regenerator being coupled to pass high pressure gases from the compressor through one portion thereof which is below the regenerator axis in an axially rearward direction and being coupled to pass exhaust gases from the turbine through a second portion thereof which is above the regenerator axis in an axially forward direction, the improvement comprising a plenum disposed about the circumference of the engine between the single stage compressor and the single stage radial flow turbine and being connected to receive all of the high pressure gases from the compressor and carry the high pressure gases to a single first high pressure duct, a single first high pressure duct coupled to carry all of the high pressure gases from the plenum axially forward to the one portion of the regenerator on the axially forward side thereof, the first high pressure duct being disposed adjacent an outer periphery of the engine below the central axis and extending past an outer periphery of the regenerator below the regenerator axis.

4,040,250

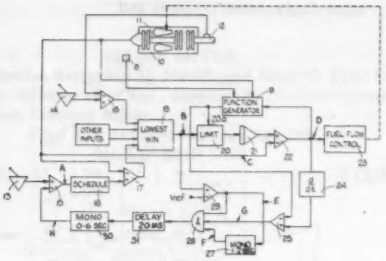
ELECTRONIC FUEL CONTROL FOR A GAS TURBINE ENGINE

Arthur Frank Saunders, West Midlands, and Graham John Hindmarsh, Birmingham, both of England, assignors to Lucas Industries Limited, Birmingham, England

Filed July 22, 1975, Ser. No. 598,048
Claims priority, application United Kingdom, July 24, 1974, 32637/74
Int. Cl.[2] F02C *9/08*
U.S. Cl. 60—39.28 R **7 Claims**

1. An electronic fuel control for a gas turbine engine, comprising: means for generating an engine speed error signal, limiter means sensitive to engine operating conditions to limit said speed error signal, an integrator for integrating said error signal, a first difference amplifier for comparing the output

signal of the integrator with an engine actual speed signal to produce a fuel error signal, and a fuel flow control actuated by said fuel error signal controlling fuel flow to the engine, surge detection means comprising means for producing a signal



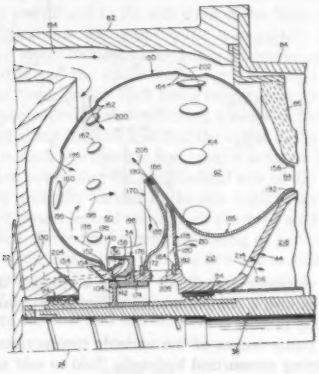
corresponding to the rate of change of the output of the difference amplifier, and a comparator means connected to produce a surge indication signal when said rate of change signal exceeds a predetermined level for a predetermined period.

4,040,251

GAS TURBINE COMBUSTION CHAMBER ARRANGEMENT

Arnold M. Heitmann, Swampscott; Walter L. Brassert, Belmont, and Donald N. Chouinard, Peabody, all of Mass., assignors to Northern Research and Engineering Corporation, Cambridge, Mass.

Continuation-in-part of Ser. No. 583,793, June 4, 1975, which is a continuation of Ser. No. 346,651, March 30, 1973, abandoned.
This application Jan. 16, 1976, Ser. No. 649,816
Int. Cl.[2] F02C *3/08, 7/18, 7/22, 7/30*
U.S. Cl. 60—39.36 **25 Claims**



1. A gas turbine comprising:

a rotatable unit mounted for rotation about a system axis, said rotatable unit including a compression component and an expansion component,

a combustion chamber disposed between said compression and expansion components, said gas turbine having a gas flow path serially through said compression component, said combustion chamber, and said expansion component,

said combustion chamber being of toroidal configuration and having two distinct annular zones, a primary zone and a dilution zone, structure in said combustion chamber having a radially extending imperforate dished surface, first ports in said combustion chamber for injecting discharge air from said compression component into said primary zone toward said dished surface, said dished surface deflecting injected compressor discharge air in a radially inward direction and setting up a toroidal recirculation pattern of generally circular cross-sectional configuration in said primary zone, said toroidal recirculation pattern including an annular flow component adjacent the inner periphery of said primary zone that is generally coaxial with said system axis and is moving toward said compression component,

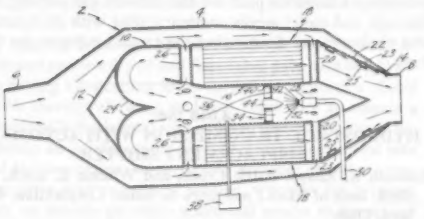
fuel injecting structure at the inner periphery of said primary zone including a stationary fuel supply source and slinger structure mounted for rotation about said system axis and spaced from the discharge end of said supply source, said slinger structure having a generally cylindrical radially inwardly facing fuel distribution surface that is disposed coaxially with said system axis and that has a closed end and an open end, said open end being closer to said compression component than said open end, said fuel distribution surface receiving fuel from said supply source for distribution and flow in a thin annular sheet across said generally cylindrical surface and discharge from the open end of said surface in a radially outward direction in a thin radial sheet of minute droplets across said annular flow component in a direction generally normal thereto and towards the center of said toroidal recirculation pattern, the radial flow of fuel droplets interacting with said toroidal recirculation pattern for achieving intimate mixing of fuel and air, and resulting efficient combustion within said primary zone, the resulting product flowing from said primary zone into said dilution zone, and second ports in said combustion chamber for injecting discharge air from said compression component into said dilution zone, the injection of compressor discharge air into said dilution zone diluting the products of combustion from said primary zone prior to flow to said expansion component.

4,040,252

CATALYTIC PREMIXING COMBUSTOR

Stanley A. Mosier, North Palm Beach, and Robert M. Pierce, Tequesta, both of Fla., assignors to United Technologies Corporation, Hartford, Conn.

Filed Jan. 30, 1976, Ser. No. 653,811
Int. Cl.[2] F02C *7/22*
U.S. Cl. 60—39.36 **8 Claims**



1. A combustion device for a power plant including in combination a burner can, said burner can including a central tubular section, an annular section located therearound, said central tubular section having an open end and a closed end, means for directing air around said burner can, first tubular means connecting the exterior of said burner can to the interior of said central tubular section adjacent its closed end to direct air thereto, opening means connecting the exterior of said burner can to the interior of said central tubular section adjacent its open end to direct air thereto, means connecting the open end of said central tubular section to the adjacent end of said annular section, transition duct means connects the other end of said annular section to an outlet, said central tubular section including a combustion chamber, means for injecting fuel into the interior of said central tubular section adjacent its closed end, means for igniting the fuel-air mixture formed in

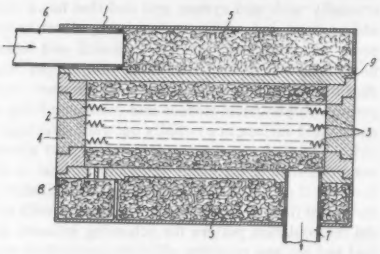
said combustion chamber, said annular section including a catalytic reaction device.

4,040,253

APPARATUS FOR TREATING EXHAUST GASES OF INTERNAL COMBUSTION ENGINES

Paul Dhugues, 40 rue du Capitaine Portales, Beausejour, and Francois Zanca, 5, rue Canizares, both of Casablanca, Morocco

Filed Oct. 21, 1971, Ser. No. 191,257
Claims priority, application France, Nov. 20, 1970, 70.41681
Int. Cl.[2] F01N *3/14*
U.S. Cl. 60—303 **4 Claims**



1. Apparatus for treating exhaust gas of internal combustion engines to eliminate therefrom its toxic constituents, especially carbon monoxide, comprising an outer shell of substantially cylindrical configuration; an inner substantially cylindrical enclosure having a peripheral wall of a material of high conductive capacity arranged spaced from and substantially coaxial with said outer shell in the latter; inlet means for feeding only exhaust gas from an internal combustion engine into said outer shell; passage means providing communication between the interior of the outer shell and the interior of said enclosure; means for heating the interior of said enclosure to a temperature so as to transform the toxic components of the exhaust gas fed thereinto into nontoxic components and to simultaneously preheat the exhaust gas in said outer shell through the heat conductive peripheral wall of said enclosure; means filling at least the space between said outer shell and said enclosure for providing a tortuous path for the exhaust gas passing therethrough; and outlet means communicating with the interior of said enclosure for discharging the treated exhaust gas therefrom.

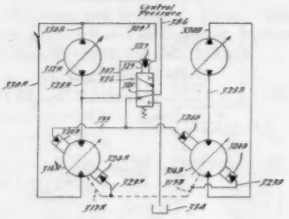
4,040,254

HYDROSTATIC TRANSMISSION WITH AUTOMATIC DISPLACEMENT SHIFTER

Kenneth K. Knapp, Battle Creek, and William E. Koch, Marshall, both of Mich., assignors to Eaton Corporation, Cleveland, Ohio

Filed Mar. 25, 1976, Ser. No. 670,333
Int. Cl.[2] B62D *11/04*
U.S. Cl. 60—420 **4 Claims**

1. A hydrostatic transmission system comprising:
a. a fluid reservoir;
b. first and second variable displacement pump means;
c. first and second variable displacement motor means each including displacement control means operable to vary the displacement of said motors between a maximum displacement and a minimum displacement;
d. first fluid conduit means interconnecting said first pump means with said first motor means, second fluid conduit means interconnecting said second pump means with said second motor means, and third fluid conduit means interconnecting said reservoir with said first and second pump means;
e. means associated solely with said first fluid conduit means to sense the magnitude of the load imposed on said first motor means; and
f. motor displacement shifting means for each motor means to:
1. bias said motor displacement control means to the minimum displacement position; and



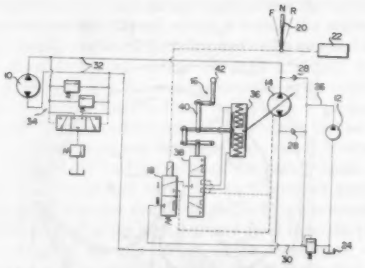
2. shift, upon sensing the application of a load on said first motor means in excess of a predetermined value, both of said motor displacement control means toward the mximum displacement position.

4,040,255

CONTROL SYSTEM FOR A HYDRAULICALLY ACTUATED DEVICE SUCH AS THE VIBRATOR MOTOR OF A SELF-PROPELLED VIBRATORY COMPACTOR

Hideo Hara, Kawasaki, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed July 29, 1976, Ser. No. 709,643
Claims priority, application Japan, July 29, 1975, 50-104123[U]
Int. Cl.[2] F16H *39/46*
U.S. Cl. 60—445 **4 Claims**



1. In a vibratory compactor having a vibrator driven by a hydraulic motor, a control system comprising in combination:
first pump means;
second pump means of the variable displacement type for supplying pressurized hydraulic fluid to said motor;
servo control means receiving pressurized hydraulic fluid from said first pump means and adapted to adjustably vary the per-cycle displacement of said second pump means, said servo control means including an actuator which is adapted to be neutralized automatically upon termination of the supply of pressurizd hydraulic fluid from said first pump means to said servo control means, with the result that said second pump means is prevented from supplying pressurized hydraulic fluid to said motor;
selector valve means for the on-off control of communication between said first pump means and said servo control means; and
valve operating means for operating said selector valve means so as to block communication between said first pump means and said servo control means when the trav-

elling speed of the vibratory compactor becomes less than a predetermined value;

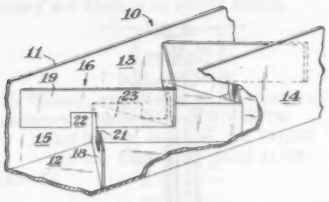
whereby said vibrator is automatically set out of operation when the travelling speed of the vibratory compactor becomes less than the predetermined value.

4,040,256

FLUME MIXER

Earl E. Bosche, Alvin; Jay M. Havlik, and James C. Kyle, both of Lake Jackson, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed July 14, 1976, Ser. No. 705,310
Int. Cl.[2] B01F 5/00
U.S. Cl. 61—15 **8 Claims**



1. A flume mixer, the flume mixer comprising a flume having a bottom, flume side walls affixed to said bottom, the side walls and the bottom defining a liquid-flow channel having a longitudinal axis extending generally parallel to the side walls and bottom, a first mixing element disposed within the flume, the first mixing element comprising at least a bottom baffle and a top baffle, the top baffle and the bottom baffle being of generally elongate configuration, the bottom baffle extending between the side walls and being affixed thereto, the bottom baffle being angularly disposed within the channel, relative to the longitudinal axis of the channel and a plane perpendicular to the longitudinal axis of the channel, a second or upper baffle being generally similarly disposed in the channel above the bottom baffle and affixed to the side walls of the flume with the further limitation that the upper baffle is angularly disposed relative to the lower baffle and vertically projected centers of the upper baffle and the lower baffle are generally adjacent, the upper and lower baffles each being asymmetric about their centers in a projection of the baffles on a cross-section of the flume channel along the axis and that the upper baffle and the lower baffle in such a projection have major areas on opposite sides of a plane containing the longitudinal axis of the channel and extending generally parallel to the side walls to form a first mixing cell, at least a second mixing cell disposed adjacent the first mixing cell, the second mixing cell being of generally like construction to the first mixing cell, the first and second mixing cells having a generally mirror image configuration about a plane normal to the longitudinal axis of the channel and disposed between the first and second mixing cells.

4,040,257

WAVE-PUMP APPARATUS

Ottie H. Andrews, 3129 Olinda Lane, Anaheim, Calif. 92804

Filed June 23, 1975, Ser. No. 589,052
Int. Cl.[2] E02B 9/08
U.S. Cl. 61—20 **1 Claim**

1. A wave-pump apparatus for installation along the shoreline of coastal waterways, wherein the waves generated therein are received into said apparatus which comprises:

a housing;

a funnel-like, mouth portion formed as an integral part of the forward end of said housing to receive said waves directly therein, said mouth portion having:

a pair of inwardly converging side walls;

a bottom wall converging inwardly and upwardly providing an angular displacement substantially equal to the angle of said shore-line;

a top wall inclined downwardly and inwardly, whereby each of said walls defines a forward, enlarged opening and a rearward, reduced opening;

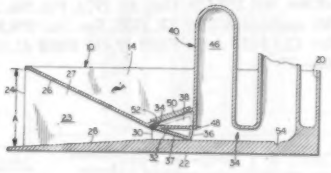
a throat portion contiguously formed aft of said mouth portion, whereby water is funneled from said mouth portion into said throat portion;

a valve means disposed at the junction of said mouth portion and said throat portion, whereby the force of the entering wave of water causes said valve to open, wherein said valve means comprises:

a flap-gate valve having converging side walls forming an apex end hingedly attached at the junction of said mouth portion and said throat portion and terminating at the junction of said mouth portion and said throat portion and terminating at the opposite end thereof with an accuately formed base wall disposed in a substantially vertical plan relative to the flow of water, whereby said base wall receives the direct force of the back pressure of the water intrapped within said throat portion;

a hinge disposed along the upper, longitudinal edge formed by said apex of said flap-gate valve and secured to the upper portion of said reduced opening of said mouth portion, whereby said gate valve hangs in a normally closed position;

a recess arranged to receive said flap-valve gate therein when said flap-valve is in an open mode of operation;



an access cover removably positioned as part of said recess, whereby access to said flap-valve is obtainable therethrough;

a bell housing defining a pressure chamber positioned adjacent and rearwardly of said flap-valve gate, said bell housing having a depending lower lip defining a portion of said recess thereby allowing said flap-valve gate to assume a substantially horizontal plan equal to that of said lower lip, wherein an uninterrupted flow of water is permitted into said throat portion, wherein said pressure chamber communicates with said throat portion, whereby the pressure built up therein provides additional means to force said water from said water tower into said conduit, and wherein said pressure chamber also provides means for absorbing back pressure developed within said apparatus;

a water tower positioned at the terminating end of said throat portion and disposed vertically thereto, said tower communicating with said throat portion, whereby water captured within said throat is forced upwardly into said tower;

a discharge conduit connected to the opposite end of said water tower, whereby the flow of water is transported to a predetermined point; and

a transverse, recessed channel disposed directly under said water tower and extending laterally outwardly from said throat portion, thereby allowing water to exit therethrough under pressure and wash foreign matter caught within said throat.

4,040,258
METHOD OF CONSOLIDATING PARTICLES

Perry A. Argabright, Larkspur, and C. Travis Presley, Littleton, both of Colo., assignors to Marathon Oil Company, Findlay, Ohio

Filed Aug. 16, 1974, Ser. No. 498,017
The portion of the term of this patent subsequent to Dec. 3, 1991, has been disclaimed.
Int. Cl.[2] E02D 3/12
U.S. Cl. 61—36 C 6 Claims

1. A process for increasing the strength and stability of a permeable mass comprising initially unconsolidated particles which process comprises:

a. preparing an aqueous solution containing a water-soluble salt of a polyisocyanuric acid in a concentration from about 0.5 to about 50% by weight and a water-soluble polymer in a concentration from about 1.0 to about 10.0% by weight selected from the group consisting of polyvinyl alcohol, hydroxyethyl cellulose, and mixtures thereof,

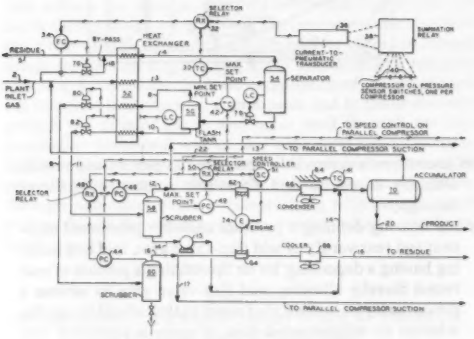
b. adjusting the pH of said aqueous solution as desired for a given application, said pH always being in excess of 7,

c. applying said aqueous solution to said unconsolidated particles and maintaining contact between said unconsolidated particles and said aqueous solution for a time sufficient to permit gelatin and the formation of a consolidated matrix containing said particles.

4,040,259
RECOVERY OF NATURAL GAS LIQUIDS BY PARTIAL CONDENSATION

Carl W. Zahn, and Hadwen A. Clayton, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 315,535, Dec. 15, 1972, Pat. No. 3,901,673. This application May 22, 1975, Ser. No. 579,993
Int. Cl.[2] F25J 3/00; F25B 41/00; F04B 41/06
U.S. Cl. 62—37 3 Claims



1. An apparatus for controlling the bypass of inlet gas around a compressor system said system comprising a plurality of compressors in parallel operations, said apparatus comprising:

1. means for sensing the compressor operating status of each compressor;

2. means for producing a signal when indicated that a compressor is operating;

3. a relay means for transmitting a plurality of said signals to a pneumatic transducer;

4. said pneumatic transducer producing a signal in response to the summation of signals from the relay means;

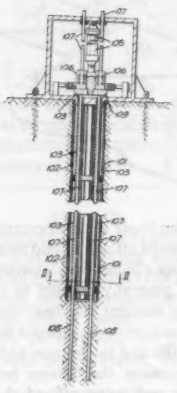
5. means for transmitting said transducer signal to a flow controlling means for modifying the transducer signal to apportion the inlet gas to be by-passed around said compressor system in an inverse proportion to said summation of signals compared to the total number of compressors in system; and

6. means responsive to said modified signal for bypassing said inversely proportioned inlet gas away from said compressor system.

4,040,260
PILE WITH DOWNWARDLY EXTENDING ELONGATED ELEMENTS

David Speaight Pryke, Brent Pelham, England, assignor to Pynford Limited, London, England

Filed Mar. 26, 1976, Ser. No. 671,023
Claims priority, application United Kingdom, Mar. 26, 1975, 12761/75; July 7, 1975, 28575/75
Int. Cl.[2] E02D 5/34
U.S. Cl. 61—53.62 11 Claims



1. A method of forming a pile comprising an elongated columnar body adapted to carry a structural load at its upper end, and a plurality of elongated elements, each of the elongated elements being of smaller cross-sectional area than said body, said elements being connected at their upper ends to said pile body, the method comrpising the steps of:

a. forming a hole in the ground approximating the size and shape of the columnar body of the pile,

b. lowering an array of guide tubes into the hole, the guide tubes being slightly larger in cross-sectional area than the elongated elements,

c. inserting elongated elements into the guide tubes,

d. applying forces to the elongated elements to drive the bottom ends thereof downwardly into the ground through the bottom of the hole,

e. lifting the array of guide tubes out of the hole, and

f. grouting the hole to form a solid pile body which is reinforced by the upper ends of the elongated elements contained therein.

4,040,261
VIBRATORY PLOW

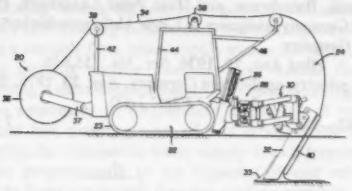
Paul R. Schuck, Daven Port, and John M. Baylor, Bettendorf, both of Iowa, assignors to J.I. Case Company, Racine, Wis.

Filed Jan. 12, 1976, Ser. No. 648,348
Int. Cl.[2] E02F 5/02; F16L 1/00
U.S. Cl. 61—72.6 14 Claims

1. A vibratory plow, including a vehicle, a frame assembly operably supported on said vehicle and a generally vertical blade supported on said frame assembly, the improvement comprising:

a U-shaped yoke pivotally supported at opposite ends on said frame assembly having a free center portion, a vibrator supported on said yoke center portion generally in the

plane of said blade and said yoke center portion pivotally connected to said blade by a link, said yoke transmitting



the vibrations generated by said vibrator to said blade and vibrating said blade in an orbital motion.

4,040,262

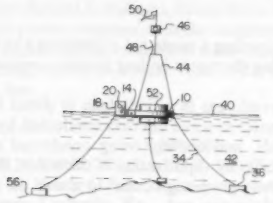
ICE ANCHOR

Preston E. Chaney, and George W. Morgan, both of Dallas, Tex., assignors to Suntech, Inc., Wayne, Pa.

Filed Sept. 8, 1976, Ser. No. 721,250

Int. Cl.[2] E02B *1/00*; B63B *21/30*

U.S. Cl. 61—86 **4 Claims**



1. Apparatus for forming an ice anchor in offshore areas covered by ice at some time during the year comprising: a banded high tensile strength material located adjacent the surface of the water and laterally enclosing a section of water in such offshore areas; buoyant float means attached to the banded material and positioned to maintain such material adjacent the water surface; attachment means connected with the banded material and located at least partially above the water surface; and means for maintaining the banded material in position relative to a selected position on the floor of the body of water.

4,040,263

ARRANGEMENT IN OR RELATING TO DRAINAGE

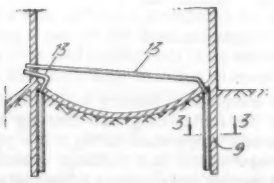
Ove Eide, and Carl F. Clausen, both of Oslo, Norway, assignors to A/S Hoyer-Ellefsen, Oslo, Norway

Filed Oct. 9, 1974, Ser. No. 513,285

Claims priority, application United Kingdom, Oct. 11, 1973, 47568/73

Int. Cl.[2] E02D *21/00*

U.S. Cl. 61—86 **2 Claims**



1. In a fully positioned marine gravity-type structure surrounded by the sea so as to be subject to cyclic loads from environmental forces and resting firmly on the seabed at a predetermined ultimate depth and orientation and at a location where the seabed material is of substantially uniform grain size distribution, continuously available means for counteracting liquefaction in the supporting soil beneath the structure at any desired time by relieving excess pore water pressure arising at any time from cyclic shearload in the supporting soil, said means comprising one or more permeable wells penetrating said supporting soil, a water-tight open-topped tower extending from the seabed to above the water surface, means communicating said wells with the lower portion of said tower, and continuously available means for selectively maintaining the water level inside said tower at a lower level than the water surface so as to maintain a lower hydrostatic pressure inside said wells than outside, and hence relieve excess pore water pressure occuring at any time in the supporting soil about said wells.

4,040,264

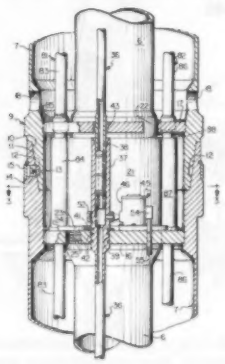
CONTROLLED BUOYANCY UNDERWATER RISER SYSTEM

Claude R. Neilon, Houston, Tex., assignor to Armco Steel Corporation, Middletown, Ohio

Filed Nov. 28, 1975, Ser. No. 635,843

Int. Cl.[2] E21B *7/12*

U.S. Cl. 61—86 **15 Claims**



1. In an underwater well riser system to be run between a floating vessel and an underwater well installation, the combination of

a primary riser comprising a plurality of lengths of riser pipe;

pipe of substantially larger diameter than said riser pipe;

a plurality of connector assemblies each adapted to interconnect two adjacent lengths of said riser pipe and to secure the upper end of one of said lengths of jacekt pipe to the upper end of the corresponding one of said lengths of riser pipe with said length of jacket pipe spaced outwardly from said one length of riser pipe and depending from the connector assembly,

there being an annular space between said one length of riser pipe and said one length of jacket pipe,

there being at least one opening communicating between said annular space and the water external to said jacket pipe in a location spaced from the top of said one length of jacket pipe;

a pressure fluid supply line comprising a plurality of lengths of pressure fluid supply pipe of a diameter such as to be accommodated in said annular space and of a length such that said connector assemblies can interconnect adjacent lengths of said pressure fluid supply pipe; and

a plurality of pressure differential valves each mounted on a different one of said connector assemblies, each of said pressure differential valves comprising

an inlet connectable to said pressure fluid supply line,

an outlet connectable to said annular space below the one of said connector assemblies on which the valve is mounted, and

valve operating means responsive to the difference between the water pressure in the location occupied by the valve and the fluid pressure at said outlet;

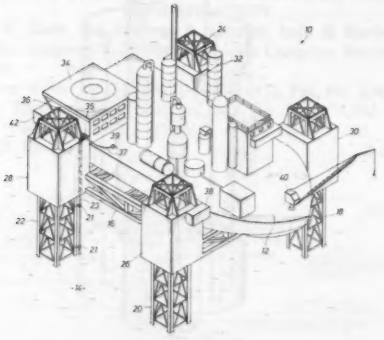
supply of pressure fluid in one direction via said pressure fluid supply line in the assembled riser system, when the system is submerged, causing water in said annular spaces to be forced out through said at least one opening of each annular space, whereby said spaces are rendered buoyant to a degree determined by operation of said pressure differential valves.

4,040,265

MOBILE OFFSHORE PLATFORM

Lance W. Hellerman, and Richard S. Hollyer, both of Houston, Tex., assignors to Marine Engineering Systems, Inc., Houston, Tex.

Filed Feb. 6, 1976, Ser. No. 655,682
Int. Cl.[2] E02B *17/04*; B63C *1/00*
U.S. Cl. 61—91 **8 Claims**



1. An offshore platform structure comprising:

a negatively buoyant one-piece platform defining a substantially horizontal support surface for accepting a vessel thereon;

a plurality of support legs on said platform being supported by the sea bottom below the surface of the water for stably supporting said platform, said legs being spaced to define a passage between said legs;

a plurality of jacking mechanisms secured to said platform and adapted to engage said legs for raising and lowering said platform with respect to said legs to position said platform above water level or below water level;

heave absorbing means disposed substantially across the passage between said legs, said heave absorbing means comprising a fender of pliable material providing a flexible surface extending above said support surface for engagement with the bottom of the vessel to dampen vertical motion thereof during docking and means for moving said fender between a first position wherein said fender is raised above the surface of the support surface to a second position wherein said fender is below the surface of the support surface; and

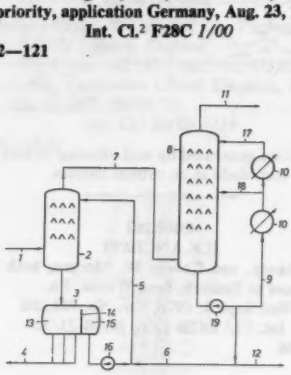
a substantially flat-bottomed work barge to be floated over said platform through said passage and to be supported without attachment on said platform at a raised position above water level.

4,040,266

MULTISTAGE COOLING OF CRUDE HYDROCARBON GASES

Horst Frank, Baierbrunn, and Hans Peter Langebach, Pullach, both of Germany, assignors to Linde Aktiengesellschaft, Wiesbaden, Germany

Filed Aug. 19, 1976, Ser. No. 715,674
Claims priority, application Germany, Aug. 23, 1975, 2538611
Int. Cl.[2] F28C *1/00*
U.S. Cl. 62—121 **7 Claims**



1. A process for cooling a crude gas containing a mixture of hydrocarbons having divergent boiling points, comprising the steps of

a. cooling said crude gas in a first stage in direct heat exchange with water to scrub out thus-condensed hydrocarbons and solids, said cooling being conducted substantially adiabatically by vaporization of the water, the resultant cooled crude gas being cooled to above the ambient temperature of the gas; and

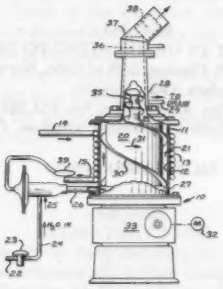
b. further cooling resultant cooled gas from said first stage in a second stage to about ambient temperature, said further cooling being provided by an external refrigerant.

4,040,267

ICE MAKER WITH THERMOSTATIC WATER CONTROL

Donald F. Swanson, St. Paul, Minn., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed June 21, 1976, Ser. No. 698,471
Int. Cl.[2] F25C *5/02*
U.S. Cl. 62—180 **16 Claims**



1. In an ice maker comprising a feeezing surface member; a refrigerating means for refrigerating said freezing surface member to a subfreezing temperature having a low pressure side including an evaporator in heat exchange contact with said freezing surface member and a gaseous refrigerant suction line connecting said evaporator to a compressor, a high pressure side including said compressor, a condenser, a refrigerant line connecting said compressor and condenser, and a liquid

refrigerant line connecting said evaporator to said condenser, and a thermostatic expansion valve connected in said liquid line and separating said high and low pressure sides of said refrigerating means; and harvesting means for removing said ice from said freezing surface member; the improvement comprising a variable flow water supply means for supplying water to said freezing surface member, said variable flow means comprising a thermostatic water valve means having a control portion responsive to temperature conditions of one of said high and low pressure sides of said refrigerating means for regulating the volumetric water supply to said freezing surface member proportionate to the capacity of said refrigerating means to form ice on said freezing surface member.

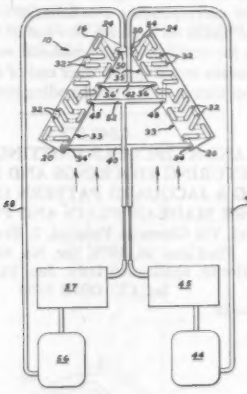
14. In an ice maker for continuous production of ice including an upright cylindrical ice freezing surface; a refrigerating means for said surface including an evaporator in heat exchange contact with said surface, a compressor, a condenser, a liquid refrigerant line connecting said evaporator to said condenser, a gaseous refrigerant suction line connecting said evaporator to said compressor, and a thermostatic expansion valve connected in said liquid line and responsive to the temperature of said suction line; and a rotatable harvest auger for removing ice from said ice freezing surface; the improvement comprising a variable flow water supply means for supplying water to said cylindrical freezing surface in excess of the amount required for the ice formed including a thermostatic water valve having a control portion responsive to the temperature of said suction line for regulating the volumetric water supply to said cylindrical freezing surface in inverse ratio to the temperature of said suction line.

4,040,268

MULTI-CIRCUITED A-COIL HEAT EXCHANGER

Webster L. Howard, Tyler, Tex., assignor to General Electric Company, Louisville, Ky.

Filed July 15, 1976, Ser. No. 705,621
Int. Cl.[2] F25B *7/00*; F25D *17/06*; F25B *39/02, 1/10*
U.S. Cl. 62—335 **8 Claims**



1. In a heat exchanger arranged in the path of a flow of air including a pair of slab heat exchangers having leading and trailing ends, said trailing ends being substantially parallel and spaced from each other to define an opening therebetween to allow movement of air therethrough, said slab heat exchangers converging toward said leading end so that substantially all of the air moving through said opening contacts and flows through both of said heat exchangers, each of said slab heat exchangers having a pair of end plates, a plurality of substantially rectangular sheet metal fins disposed in spaced parallel relation between said end plates, wherein the improvement comprises:

a plurality of straight tube runs extending through aligned holes in said fins and said end plates,

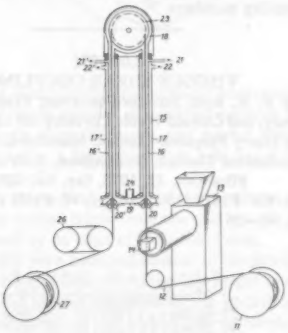
a plurality of return bends associated with each of said slab heat exchangers being located outwardly of said end plates connecting selected groups of adjacent straight tube runs so as to provide a first sinuous circuit in each of said slabs arranged so that one end of said first circuit is adjacent the trailing ends thereof and a second sinuous circuit arranged substantially between the first circuit and the leading ends of each of said slab heat exchangers being arranged so that substantially all of said first circuit in each heat exchanger is downstream in said air flow relative to their respective second circuit.

4,040,269

APPARATUS FOR CONTINUOUSLY COOLING WIRE SHAPED OBJECTS

Sven Sigurd Nordblad, Spanga, and Karl-Erik Svensson, Hagersten, both of Sweden, assignors to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Nov. 13, 1975, Ser. No. 631,530
Claims priority, application Sweden, Dec. 2, 1974, 7415044
Int. Cl.[2] F25D *17/02*
U.S. Cl. 62—374 **9 Claims**



1. Apparatus for continuously cooling a wire-shaped object comprising a vertically extending first pipe, means for guiding the object coaxially through said first pipe, liquid feeding means for feeding liquid coolant onto the inner surface of the wall of said first pipe, said feeding means being near the top of said first pipe whereby the coolant can flow down the inner wall of said first pipe, a plurality of openings in the wall of said first pipe, a second pipe coaxially surrounding said first pipe, means for sealing the ends of said second pipe to said first pipe to provide a manifold, gas feeding means connected to said second pipe for feeding a gas under pressure to the manifold whereby jets of the gas can pass through the openings in said first pipe to vaporize and propel the coolant to form a mist around the object.

4,040,270

COUPLING ADAPTED TO CONNECT RADIALLY OFFSET SHAFTS

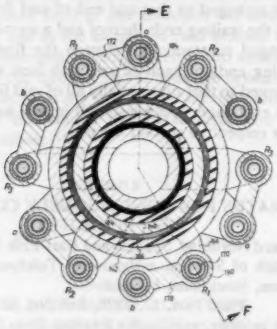
Ilie Chivari, Berliner Strasse 1, 4680 Wanne-Eickel, Germany

Filed May 8, 1975, Ser. No. 575,815
Claims priority, application Germany, June 29, 1974, 2431383; Mar. 22, 1975, 2512829
Int. Cl.[2] F16D *3/54*
U.S. Cl. 64—19 **38 Claims**

1. In a rotary coupling comprising a first main coupling member defining a first axis, a second main coupling member defining a second axis, intermediate coupling member means, and connecting means interconnecting the intermediate coupling member means and said main coupling members to per-

mit said second axis to be radially offset with respect to said first axis, the improvement comprising:

said intermediate coupling member means comprising two intermediate coupling members rotatable relative to each other about a third axis;



said connecting means comprising links connecting each of intermediate coupling members with each of said main coupling members.

4,040,271

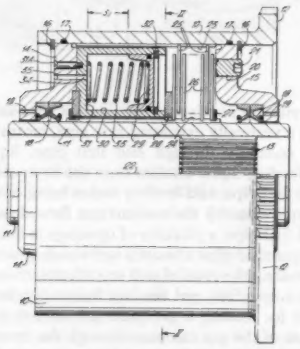
VISCOUS SHEAR COUPLINGS

Anthony P. R. Rolt, Stratford-on-Avon; Frederick J. Walker, Banbury, and Oswald Webb, Coventry, all of England, assignors to Harry Ferguson Limited, Moreton-in-March and GKN Transmissions Limited, Birmingham, both of, England

Filed Oct. 22, 1975, Ser. No. 624,980

Int. Cl.[2] F16D *3/80*; F16H *1/44*; F16D *19/00, 31/00*

U.S. Cl. 64—26 **11 Claims**



1. A control coupling comprising mutually spaced and mutually interleaved plate elements arranged for rotation about a common axis within an enclosure containing a viscous liquid in contact with adjacent surfaces of said plate elements, alternate ones of said plate elements constituting a first set of plate elements for driving connection with a first rotatable member, remaining ones of said plate elements constituting a second set of plate elements for driving connection with a second rotatable member, the plates of at least one set being free to move in directions parallel to said common axis, the enclosure including movable means movable independently of said plates for varying the volume of the enclosure and resiliently yieldable means provided to urge said movable means towards a limit position in which said volume has a minimum value, the strength of the resiliently yieldable means being chosen according to a desired torque transmitting characteristic for the coupling, and the quantity of viscous liquid within the enclosure being such that at an ambient temperature of 25° C and with the coupling at rest the viscous liquid occupies a volume in the range of 85 % to 100 % of said minimum value.

4,040,272

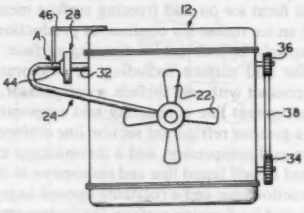
FLEXIBLE DRIVE FOR ROTATING A FAN

Keith A. Boyd, Marshall, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Jan. 26, 1976, Ser. No. 652,259

Int. Cl.[2] F16D *3/00*

U.S. Cl. 64—26 **12 Claims**



1. An accessory drive for rotating a fan used to cool a prime mover of a vehicle, the prime mover having an output shaft adapted for rotation, the drive comprising:

A. an elongated flexible shaft terminating at a pair of ends;

B. a declutchable device having

1. an input element,
2. an output element, and
3. means to transmit torque between the input element and the output element in response to rotation of one of the elements and to restrict such torque transmission during rotation of one of the elements, said torque transmitting means comprising said input element and said output element cooperating to define a shear space, a viscous fluid being contained within said shear space to transmit torque by viscous shear stress;

C. first means for securing one of the elements to the output shaft for corresponding rotational movement;

D. second means for securing one end of the flexible shaft to the fan for corresponding rotational movement; and

E. third means securing the other end of the flexible shaft to the other element for corresponding rotational movement.

4,040,273

METHOD AND A CIRCULAR KNITTING MACHINE FOR MANUFACTURING STOCKINGS AND LIKE ARTICLES HAVING A JACQUARD PATTERN OVER RIBBED KNITWORK MADE OF PLAIN AND PURL STITCHES

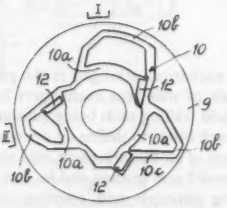
Aldo Bonazzi, Via Gherardo Vaiarini, 2, Brescia, Italy

Filed Jan. 26, 1976, Ser. No. 652,588

Claims priority, application Italy, Jan. 31, 1975, 19852/75

Int. Cl.[2] D04B *9/06*

U.S. Cl. 66—19 **1 Claim**



1. A circular knitting machine for manufacturing stockings and like articles having a jacquard pattern over ribbed knitwork made of plain and purl stitches, comprising at least two different thread feeds, e.g. of different colors, a needle dial and

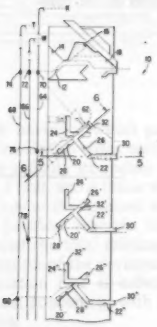
a needle cylinder rotating in timed relationship and having needles movable thereon, the needles of the needle dial being one half in number as the needles of the needle cylinder, means for reciprocating said needle dial and needle cylinder, means for independently selecting the needles of the needle dial and of the needle cylinder to knit at a corresponding thread feed, means for simultaneously and selectively controlling at least part of the needles of said needle dial and the corresponding underlying needles of the needle cylinder for transferring the loops from said part of the dial needles to the corresponding underlying cylinder needles, wherein said needles of the needle dial have butts of at least two different heights and are grouped in at least two groups each comprising the dial needles having a same butt height, and wherein said means for selecting the needles of the needle dial comprise a stationary disc located over the needle dial and provided with cams defining a path for the butts of the needles of the needle dial, said cams comprising fixed cams defining an inner continuous groove portion for the butts and outer groove portions at each feed area departing from said inner groove portion and returning therein to cause the dial needles to radially project for taking up the thread at the corresponding thread feed and an additional outer groove portion at a point between two feeds at a non-knitting area for causing selected dial needles to outwardly project for trasferring loops to corresponding cylinder needles, and a vertically movable cam at each zone of departure of said outer groove portions from said inner groove portion, said movable cams being movable between a position external to said groove portions and a position fully internal thereto and the movable cam provided at the departure of said additional outer groove portion being further movable into at least one position intermediate between the position external to said groove portions and the position completely internal thereto to cause dial needle selection for loop transfer according to the butt height of the dial needles.

4,040,274

KNIT, TUCK AND WELT CAMS FOR CIRCULAR KNITTING MACHINES

John Christopoulos, Charlotte, N.C., assignor to The Singer Company, New York, N.Y.

Filed June 14, 1976, Ser. No. 696,090
Int. Cl.[2] D04B *15/32*
U.S. Cl. 66—57 **5 Claims**



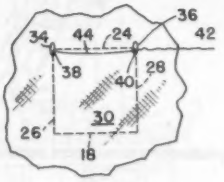
1. In a cam section block, a first straight slot (**20**) and a first two legged angular slot (**26**) with the straight slot (**20**) and one leg of the angular slot (**26**) in alignment, a second straight slot (**22′, 20″**), a second two legged angular slot (**26′, 24″**)a first two legged angular cam member (**32**) in the first angular slot (**26**), a first flat plate like cam member (**29**) in the first straight slot (**20**) for acting in conjunction with one leg of the first angular cam member (**32**) to raise predetermined needles moving relative to the cam section to a latch clear position, a second two legged angular cam member (**32′, 32″**) in the second angular slot (**26′, 24″**), and a second flat plate like cam member (**30′, 28″**) in the second straight slot (**22′, 20″**) for acting in conjunction with one leg of the second angular cam member (**32′, 32″**), the second angular slot and second flat slot being disposed to cause the cams therein to control the position of other predetermined needles moving relative to the cam section in a manner different from the cam members in the said first slots (**20, 26**).

4,040,275

KNIT-IN POCKET AND METHOD

Leo J. Castello, 3702 Burnett Lane, Huntingdon Valley, Pa. 19006

Filed Apr. 11, 1974, Ser. No. 460,064
Int. Cl.[2] D04B *1/24*
U.S. Cl. 66—64 **6 Claims**



1. The method of automatically knitting a pocket intermediate the top and bottom margins of a knitted garment having a panel area of single layer thickness, said pocket area having edges including a top, a bottom, a right side and a left side, including the steps of

knitting from a yarn a first portion of the panel area of single layer, ribbed knitted fabric from one said margin to a first height defined by an edge of the pocket area;

knitting from the yarn a second portion of the panel area of single layer rib knit fabric from the first height to a second height defined by the top edge of the pocket area and simultaneously knitting the pocket area of tubular jersey knit, comprising a front pocket panel and a rear pocket panel;

joining the front and rear pocket panels to the second portion of the panel area at the top, bottom and sides thereof, said top comprising a top coursewise yarn thread;

knitting from the yarn a third portion of the panel area of single layer rib knit fabric from the second height to a third height defined by the second said margin;

knitting a long knitted yarn loop at the intersections of the pocket area top edge with each pocket panel side edge to expose a portion of the top coursewise yarn thread within the loop, cutting the top coursewise yarn thread at each loop and removing only that portion of the thread defined between the loops to separate the pocket top edge from the panel area.

4,040,276

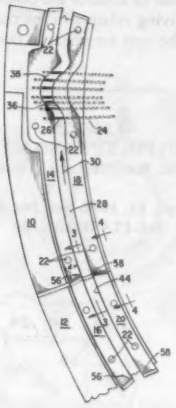
SINKLER CAM SEGMENT

Ralph A. Koegel, Brookfield, Wis., assignor to Bunker Ramo Corporation, Oak Brook, Ill.

Filed July 16, 1975, Ser. No. 596,470
Int. Cl.[2] D04B *15/06*
U.S. Cl. 66—107 **5 Claims**

1. For use in a knitting machine having a circular cam ring extending about an axis center line, a removable cam segment for said sinker cam ring, said cam segment having a sinker-actuating cam surface formed thereon facing said axis center line, generated by elements parallel to said axis center line, and said segment having corners at the intersection of the ends

thereof and said cam surface and which corners are along lines which are at a generally oblique angle to said axis center line



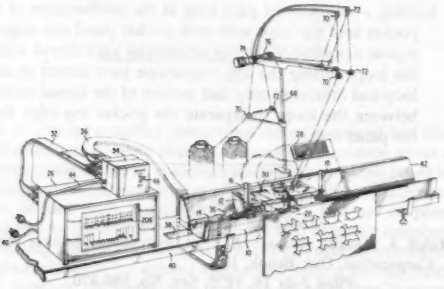
and complementary to adjacent corners in joints with said cam ring.

4,040,277

AUTOMATED HOME KNITTING MACHINE WITH PROGRAM CARD READER

William Kahan, New York, N.Y.; Fredrick Alexander Rupinski, Lyndhurst, N.J.; John Francis Wagner, Garden City, N.Y., and Thomas Richard Peer, Glenwood, N.J., assignors to The Singer Company, New York, N.Y.

Filed Oct. 30, 1975, Ser. No. 627,173
Int. Cl.[2] D04B *15/66*
U.S. Cl. 66—154 A **25 Claims**



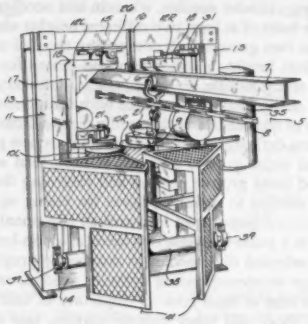
1. In a programmable knitting machine, the combination comprising a relatively movable program card and card reader, the reader including electronic means which detects the edge of the card, and other electronic detecting means enabled in response to operation of the first mentioned means and disposed in the reader to read a portion of the card beyond the edge when the edge is detected.

4,040,278

METHOD OF AND APPARATUS FOR REMOVING BRINE FROM HIDES

John E. Zimmerman, and Richard M. Reis, Sr., both of Janesville, Wis., assignors to Northern Conveyor & Manufacturing Corporation, Janesville, Wis.

Filed Dec. 17, 1976, Ser. No. 751,732
Int. Cl.[2] C14B *1/06*
U.S. Cl. 69—42 **13 Claims**



1. The method of removing brine from wet brine-soaked hides, which comprises:

A. hanging the hides on hooks of an elevated conveyor;

B. by means of the conveyor, advancing the hides along a substantially horizontal path towards and through a pair of substantially vertically oriented pressure loaded power-driven wringer rolls with the part of each hide that is engaged by its respective conveyor hook moving in a path just slightly higher than the upper end of the wringer rolls; and

C. lifting the trailing portion of each hide as it is about to be clamped between the wringer rolls, to an elevation sufficiently above the lower end of the wringer rolls to assure that all but the very small part of the hide that spans the distance between the upper end of the wringer rolls and the path of the conveyor hooks will be subjected to the wringing action of the rolls.

4,040,279

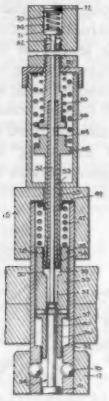
SECURITY LOCK AND KEY

John A. Signorelli, 2150 E. 29th St., Brooklyn, N.Y. 11229, and Paul Z. Haus, Jr., 787 Hartwell St., Teaneck, N.J. 07666

Filed Oct. 4, 1976, Ser. No. 728,943
Int. Cl.[2] E05B *67/36*
U.S. Cl. 70—34 **23 Claims**

1. A lock having a generally cylindrical body with an axial bore and spring loaded plunger means movable within the bore for holding extensible locking members in extended position, said plunger means including a first part retractible by use of

expanding key means and a second part biased to follow said first plunger part upon retraction thereof, so that said second



part must be restrained against motion to release the locking members.

4,040,280

ANTI-MANIPULATION DEVICE FOR PERMUTATION LOCKS

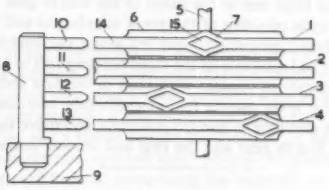
James Main, 10, Queen Elizabeth Crescent, Accrington, Lancashire; Leslie Robert Moss, 30, Baird Gardens, Dulwich Wood Park, London, S.E. 19, and Ralph Perryman, 138, Stafford Road, Caterham, Surrey, all of England

Filed Dec. 16, 1975, Ser. No. 641,246

Claims priority, application United Kingdom, Dec. 17, 1974, 54519/74

Int. Cl.[2] E05B *15/14*

U.S. Cl. 70—333 R 4 Claims



1. A permutation lock having a wheel pack comprising a plurality of rotatable permutation discs each of which has a peripheral portion and a radially extending recess in the peripheral portion thereof, a bolt, and a fence which moves with the bolt and which engages in the recesses of said discs when the bolt is in a retracted position, wherein the construction of the wheel pack is such that the total thickness, in a direction parallel to the axis of rotation of the permutation discs, of the material of each permutation disc is substantially constant along any cylindrical locus concentric with the said axis and passing through the recess.

4,040,281

PULLEY SPLITTING MACHINE-CONTROL SYSTEM

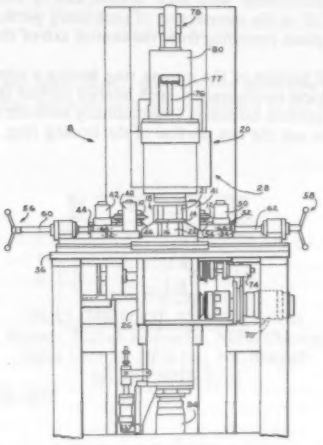
Bengt E. Meyer, Chardon, Ohio, assignor to Eaton Corporation, Cleveland, Ohio

Continuation of Ser. No. 679,261, April 22, 1976, abandoned. This application Nov. 15, 1976, Ser. No. 741,915

Int. Cl.[2] B21B *37/00;* B21D *22/14*

U.S. Cl. 72—10 13 Claims

1. An apparatus for manufacturing split pulleys comprising a spindle for rotatably supporting a blank to be split, first motor means connected with said spindle for effecting rotation of said spindle and a blank supported therein, a first rotatable tool disposed adjacent said spindle and having an axis of rotation parallel to the axis of rotation of said spindle, said first tool being movable relative to said spindle for effecting engagement of said first tool with the peripheral edge of a blank supported by said spindle, second motor means for effecting rotation of said first tool, a second rotatable tool disposed adjacent said spindle and having an axis of rotation parallel to the axis of rotation of said spindle, said second tool being movable relative to said spindle for effecting engagement of said second tool with the peripheral edge of a blank supported by said spindle, third motor means for effecting rotation of said second



tool, first sensing means for establishing a first signal indicative of the speed of rotation of said first tool, second sensing means for establishing a second signal indicative of the speed of rotation of said second tool, and control means responsive to said first and second signals for controlling the energization of said first motor means to control the speed of said spindle, said control means controlling the speed of said spindle to match the peripheral speed of a blank supported by said spindle with the peripheral speed of the first tool during initial engagement of said first tool with the rotating blank, said control means further controlling the speed of said spindle to match the peripheral speed of a blank supported by said spindle with the peripheral speed of the second tool during initial engagement of said second tool with the rotating blank.

4,040,282

IRONING RING HAVING IMPROVED LUBRICATING CHARACTERISTICS

William T. Saunders, Weirton, W. Va., assignor to National Steel Corporation, Pittsburgh, Pa.

Filed Nov. 24, 1975, Ser. No. 634,518

Int. Cl.[2] B21D *22/28*

U.S. Cl. 72—41 4 Claims

1. Improved ironing ring which facilitates ironing of flat rolled steel blackplate container stock in which ironing operation the sidewall of a unitary cup-shaped article is elongated and thinned by passage of the cup-shaped article, while mounted on an ironing mandrel, through an ironing ring concentrically mounted with respect to the ironing mandrel with the central axis of the ironing ring coincident with the longitudinal axis of the ironing mandrel,

such ironing ring having a circular interior configuration in a cross-sectional plane which is perpendicular to the central axis of the ironing ring and longitudinal axis of the ironing mandrel during an ironing operation, such longitu-

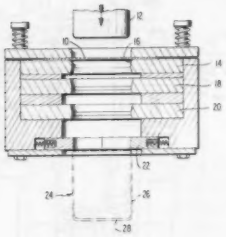
dinal axis being coincident with the direction of movement of the ironing mandrel,

the ironing ring defining a plurality of surface areas along its interior surface confronting the cylindrical exterior surface of the ironing mandrel mounted cup-shaped article,

such interior surface areas of the ironing ring being symmetrical with respect to the central axis and comprising an entry portion, a dwell portion, and an exit portion confronted in that order during a working stroke of the ironing mandrel,

the entry portion of the ironing ring defining a truncated coincal configuration with its largest diameter in the direction of approach of the ironing mandrel on its working stroke, such entry portion interior surface having an angled relationship with such central axis of about 5° to about 15° at the intersection of such entry portion with a radial plane extending from the central axis of the ironing ring,

the dwell portion of the ironing ring having a substantially cylindrical configuration, such interior surface area of the dwell portion extending longitudinally between the entry portion and the exit portion of the ironing ring,



the exit portion of the ironing ring having a truncated conical configuration with its smallest diameter in the direction of approach of the ironing mandrel on its working stroke,

such exit portion of the ironing ring having an internal surface having an angled relationship with the central axis of less than 5° to prevent binding of sheet metal as the ironing mandrel is driven through the ironing ring, such angled relationship existing at the intersection of such exit portion with a radial plane extending from the central axis of the ironing ring,

such interior surface area of the entry portion of the ironing ring presenting fine-line indentations which act to hold surface lubricant during the working stroke of an ironing operation, such fine-line indentations extending over the surface area of the entry portion contacted by the cup-shaped article during the working stroke and extending toward the dwell portion of the ironing ring, and

such fine-line indentations presenting a center line average of surface irregularities between about 20 and about 50 micro inches.

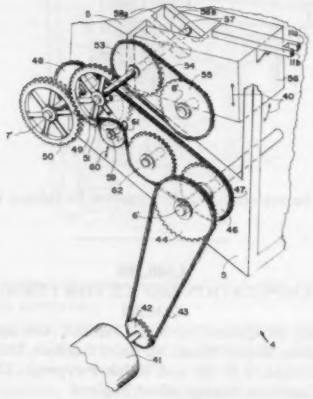
4,040,283

BENDING ROLLS MACHINE

Patsy Suriano, Suriano's Welding Service, 1219 Kennedy Blvd., Manville, N.J. 08835

Filed Nov. 2, 1976, Ser. No. 738,026
Int. Cl.[2] B21D *5/08*
U.S. Cl. 72—175 **5 Claims**

1. A bending rolls device comprising in combination: support structure having forward and rearward faces; spaced-apart first and second bending rolls and first and second shafts thereof each mounting fixedly its respective one of the first and second bending rolls, at forward ends of the respective first and second shafts respectively, and first and second gears each mounted fixedly on its respective one of the first and second shafts, the first and second shafts extending through the support structure with the first and second bending rolls located on the forward face and with the first and second gears located on the rearward face of the support structure, the support structure having a through-slot space formed therein extending through the support structure between the forward and rearward faces, with the length of the through-slot extending transversely to an imaginary line extending linearly between the first and second bending rolls; a third bending roll, a third gear, and a third shaft fixedly mounting the third bending roll on the forward face and the third gear on the rearward face, and the third shaft extending through said through-slot mounted movable transversely to the longitudinal axis of the third shaft along the length of the through-slot; a pivot member



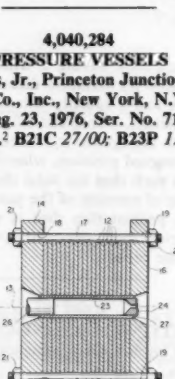
and pivot-point drive shaft pivotably mounting the pivot member thereon at a proximal end of the pivot member, the third shaft being mounted within a distal end of the pivot member, and a fourth gear mounted on the pivot-point drive shaft, and a linking chain mounted on and between and transmitable of driving force from one to the other of the fourth gear and the third gear; upon pivoting of the pivot member to and fro, the third shaft being movable to and fro along the length of the through-slot and movable of the third bending roll to and from a contacting state of contact with each of the first and second bending rolls; lever means for intermittently positioning the distal end in alternate to and fro positions; and drive means for driving the fourth gear and the first and second gears.

4,040,284

PRESSURE VESSELS

Francis Joseph Fuchs, Jr., Princeton Junction, N.J., assignor to Western Electric Co., Inc., New York, N.Y.

Filed Aug. 23, 1976, Ser. No. 716,492
Int. Cl.[2] B21C *27/00;* **B23P** *11/00*
U.S. Cl. 72—272 **14 Claims**



1. A pressure vessel, comprising:

a plurality of like, flexible, metallic, generally annular ele-

ments, each having, in an unstressed condition, a dished configuration including a concave surface facing away from a radial plane passing through the generally annular element along the inner periphery thereof, the generally annular elements forming an in-line array, extending in an axial direction, with the radial planes of the generally annular elements extending in parallel;

means, effective to apply a compressive force to the array of generally annular elements in the axial direction, for clamping the generally annular elements together so as to maintain the generally annular elements in a flattened, substantially parallel-extending configuration, while prestressing the individual, generally annular elements forming the configuration; and

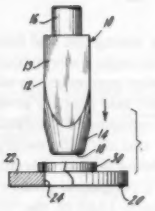
means for closing the axially opposite ends of the array of generally annular elements.

4,040,285

METHOD AND APPARATUS FOR MAKING JEWELRY BANDS

Abraham Winzelberg, Flushing, N.Y., assignor to Frank Ellman Co., Inc., New York, N.Y.

Filed June 29, 1976, Ser. No. 700,907
Int. Cl.[2] B21D *11/02*
U.S. Cl. 72—370 **2 Claims**



1. A method of forming a blank band into a jewelry band having a different predetermined size and shape by employing an apparatus including a male member with a tapered front portion merging into a rear portion of said predetermined size and shape, and a planar female member having an aperture of said predetermined size and shape adapted to receive said male member, said method comprising the steps of:

positioning said blank for sliding movement on said male member;

forcing said male member and said female member into relative movement, so that said blank is moved along the front portion and onto the rear portion of said male member, thereby forming said blank substantially to said predetermined size and shape, and

compressing said formed blank against the sides of said male member rear portion to produce a band of said predetermined size and shape.

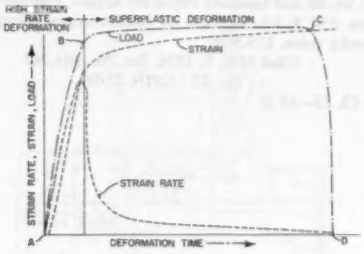
4,040,286

HIGH-PRECISION, FINE-DETAIL FORGING PROCESS

Philip Herbert Abramowitz, Beaver, and Robert Wayne Balliett, Beaver Falls, both of Pa., assignors to St. Joe Minerals Corporation, New York, N.Y.

Filed Oct. 9, 1975, Ser. No. 621,248
Int. Cl.[2] B21D *31/00*
U.S. Cl. 72—377 **3 Claims**

1. A process for forming high-precision, fine-detail forging from a superplastic workpiece characterized by utilizing high strain rate forming to impart the bulk of the total deformation



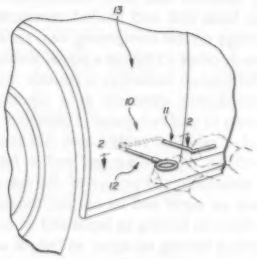
required and superplastic relatively low strain rate forming to impart detail and approach final tolerances in the product.

4,040,287

PULLING TOOL AND METHOD

Gerald P. Wivinis, 3325-B Beacon St., North Chicago, Ill. 60064

Filed May 13, 1976, Ser. No. 686,049
Int. Cl.[2] B21D *1/12*
U.S. Cl. 72—479 **6 Claims**



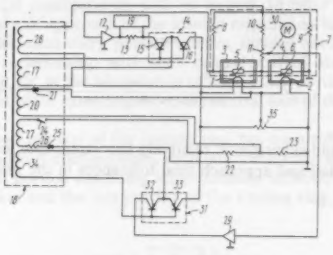
1. A pulling tool comprising, in combination: a first pulling member having a pair of legs which are formed generally L-shaped, and a second pulling member of an extended length having hook means formed on one end thereof which is adapted to releasably hookingly engage with one of said legs of said first pulling member and coupling means on the other end thereof for permitting said second pulling member to be pulled; one of said legs of said first pulling member being inserted through a first aperture formed in an object and said first pulling member being manipulated such that said one of said legs is disposed to extend generally parallel with said object; said hook means on said second pulling member being inserted through a second aperture which is formed in the object in a spaced and laterally variable position relative to the first aperture and being releasably hookingly engaged with said one of said legs, said first pulling member at the juncture of said pair of legs being formed with an offset radius so as to provide a recessed cavity into which the edge of the object about said first aperture extends to prevent the formation of a dimple on the object when a pulling force is exerted on the pulling tool, whereby a pulling force exerted on at least said second pulling member is translated to the object by the cooperative action of said first and second pulling members.

4,040,288

DIFFERENTIAL MICROCALORIMETER

Grigory Vladimirovich Kotelnikov, Puschino, Mikroraion "G", 10, kv. 56, and Gennady Petrovich Krylov, Puschino, Mikroraion AB, 9, kv. 50, both of Moskovskaya oblast, Serpukhovsky raion, U.S.S.R.

Filed Mar. 5, 1976, Ser. No. 664,267
Int. Cl.[2] G01N *25/00*
U.S. Cl. 73—15 B 8 Claims



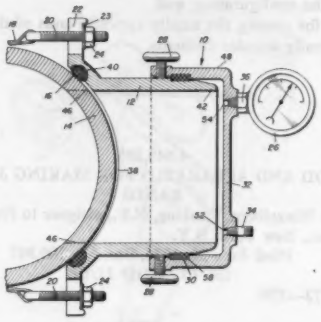
1. A differential microcalorimeter comprising: a first heating element having first and second terminals; a second heating element having first and second terminals, said first terminals of said heating elements being connected to each other; first and second thermosensitive elements; a working cell accommodating said first thermosensitive element and said first heating element; a reference cell accommodating said second heating element and said second thermosensitive element; a temperature measuring circuit incorporating said first and second thermosensitive elements, said temperature measuring circuit comprising resistors and said thermosensitive elements and arranged to form first and second measuring bridge circuits, said first bridge circuit comprising two parallel branches connected to each other to define a signal voltage input diagonal, each parallel branch including a resistor connected to one of said thermosensitive elements at a junction point, the two junction points of said two parallel branches defining a measuring diagonal of said first bridge, and said second bridge having a signal voltage input diagonal and a measuring diagonal; means for measuring the power of the thermal process under study having an input and an output; means for programmed heating of the cells having an input and an output; a first phase-sensitive switch having an input, an output and a control input; a second phase-sensitive switch having an input, an output and a control input, said input of said device for measuring the power of the thermal process under study being connected to the measuring diagonal of said first bridge circuit of said temperature measuring circuit, said input of said device for programmed heating of the cells being connected to said measuring diagonal of said second bridge circuit of said temperature measuring circuit, said output of said means for measuring the power of the thermal process under study being connected to said input of said first phase-sensitive switch; said output of said means for programmed heating being connected to said input of said second phase-sensitive switch, said outputs of said first and second phase-sensitive switches being connected to said heating elements; a variable resistor for adjusting the baseline having a first, movable terminal connected to said first terminals of said heating elements and two second terminals connected to said second terminals of said heating elements; an a-c voltage source having a plurality of outputs a first of which is connected to said control input of said first phase-sensitive switch, a second of said outputs of said a-c voltage source is connected to said control input of said second phase-sensitive switch, a third of said outputs of said a-c voltage cource comprising a unidirectional pulse output which consists of two terminals the first of which is connected to said first terminals of said heating elements and said second terminal is connected, via elements of a unidirectional pulse splitting circuit, to said second terminals of said heating elements.

4,040,289

METHOD AND ARRANGEMENT FOR AIR TESTING OF SEWER LATERAL CONNECTIONS

Joseph H. Clark, 4015 Woodley Road, Ellicott City, Md. 21043, and Leslie W. Grove, Jr., P.O. Box 609, Frederick, Md. 21701

Continuation of Ser. No. 304,602, Nov. 8, 1972, abandoned. This application Apr. 10, 1974, Ser. No. 459,838
Int. Cl.[2] G01M *3/28*
U.S. Cl. 73—46 1 Claim



1. Apparatus for testing the seal formed between a primary sewer main and a secondary sewer connector upon assembly of said secondary sewer connector to said primary sewer main prior to tapping into said primary sewer main, said secondary sewer connector consisting of a substantially cylindrical housing mating at one end with the outer surface of said primary sewer main and being sealed thereto, said secondary sewer connector having a peripheral groove adjacent to, but spaced apart from the inside edge of the wall of said substantially cylindrical housing, said seal consisting of a flexible rubber ring set in said groove in said wall of said substantially cylindrical housing, said flexible rubber ring interfacing with said outer surface of said primary sewer main and securely sealed to said outer surface by at least one removably attached clamping strap with toggle connectors at each end, said clamping strap encompassing said primary sewer main opposite said secondary sewer connector, each end of said clamping strap terminating in a welded loop into each of which is fitted the eye of said toggle connector, each said toggle connector being removably engaged and connected at the upper end of said toggle connector into open end of horizontal lug yokes attached to two sides of said secondary sewer connector, with a nut on each said toggle connector in order to tighten said clamping strap around said primary sewer main and thereby compress said flexible rubber ring to establish said seal, said substantially cylindrical housing being open at the end opposite of said seal with the primary sewer main to receive said apparatus for testing said seal, said apparatus for testing said seal formed between said primary sewer main and said secondary sewer connector comprising:

a cylindrical housing cap, said cap being open at one end to receive said open end of said secondary sewer connector, and closed at its opposite end, said closed end having spaced inlet and outlet ports disposed therein;

a plurality of screw knobs oppositely mounted on said cylindrical housing cap and engageable with said secondary sewer connector for fixedly securing said cylindrical housing cap to said secondary sewer connector to form an enclosed chamber defined by said cylindrical housing cap, said secondary sewer connector, and that portion of said primary sewer main connected to said secondary sewer

connector, said cylindrical housing cap having an annular slot in the inner wall thereof;

a flexible rubber sealing annular gasket disposed between said cylindrical housing cap and said secondary sewer connector, and fixedly held within said annular slot disposed in said inner wall of said cylindrical housing cap, said annular gasket being held in said annular slot for contact against an outer wall of said secondary sewer connector;

means for introducing a gas under pressure into said enclosed chamber through said inlet port;

a pressure gauge for measuring the pressure in said enclosed chamber; and a valve for removing said pressure in the enclosed chamber through said outlet port.

4,040,290

VIBRATION AMPLITUDE TRANSDUCER

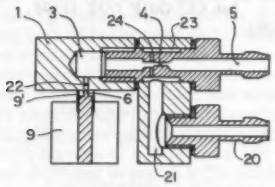
Peter Leendert Holster; Adam Ooms, both of Eindhoven, and Marinus Johannes Gerardus van den Hoogen, Venlo, all of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 14, 1975, Ser. No. 622,096

Claims priority, application Netherlands, Oct. 30, 1974, 7414155

Int. Cl.[2] G01H *1/00*; G01P *15/02*

U.S. Cl. 73—71 **6 Claims**



1. A transducer for measuring the amplitude of vibration of a vibrating member, comprising a duct having an outflow aperture, means for providing a flow of compressed air to said duct, means for sensing the outflowing quantity of air, an obstructing element, and means for mounting said duct and said element for relative motion transverse to the direction of air flow through said aperture in response to the amplitude of vibration of a vibrating member, said element being arranged opposite said aperture so as to obstruct air flow therethrough at least partially when said element and aperture are in a central position of said relative movement,

wherein said obstructing element comprises means for preventing negative pressure due to air flow along a side of the element.

4,040,291

HARDNESS TESTER

Bernard John Ince, Carlingford, Australia, assignor to Girlock Limited of Belmore, Australia

Filed Feb. 10, 1976, Ser. No. 656,944

Claims priority, application Australia, Feb. 21, 1975, 0684/75

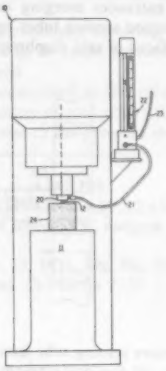
Int. Cl.[2] G01N *3/42*

U.S. Cl. 73—81 **8 Claims**

5. A penetrator member for measuring surface hardness of an object comprising:

marker means having a hardened end for making an impression in said object when said end is pressed there against;

hole means defining an aperture in said end of said marker means;



passage means for placing said hole means in communication with a pressure source.

4,040,292

METHOD AND APPARATUS FOR INDICATING THE DENSITY OF BALLAST

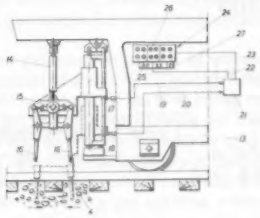
Josef Theurer, Vienna, Austria, and Waldemar Friedrich Thöle, Johannesburg, South Africa, assignors to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H., Vienna, Austria

Filed Dec. 24, 1975, Ser. No. 644,325

Claims priority, application Austria, Jan. 28, 1975, 617/75

Int. Cl.[2] G01N *3/40, 33/24*

U.S. Cl. 73—84 **11 Claims**



1. In an apparatus for indicating the density of track supporting ballast, combined with a mobile track tamping machine and comprising a tool capable of penetrating into the ballast, a drive for applying a force to the tool to immerse the same in the ballast, a signal emitter producing a signal indicating the density of the ballast, and an indicator associated with the signal emitter to receive and indicate the signal: the improvement of

1. the signal emitter being a time measuring device for measuring the time required by the tool for immersion in the ballast through a predetermined immersion stroke and
2. spaced switching elements arranged to be actuated by the displacement of the penetrating tool a predetermined distance and for actuating the signal emitter to transmit corresponding time signals to the indicator.

4,040,293

FLUID FLOW MEASURING DEVICE

Alexander Connor Wilson, Marlow, England, assignor to Airflow Developments Limited, High Wycombe, England

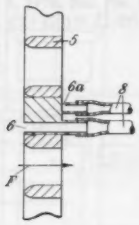
Filed Dec. 22, 1975, Ser. No. 643,619

Int. Cl.[2] G01F *1/36*

U.S. Cl. 73—211 **3 Claims**

1. A fluid- flow measuring device comprising a tubular

member; a diaphragm in said tubular member and having a multiplicity of closely spaced fluid flow holes, said holes having bellmouthed entrances merging into parallel cylindrical sections: fluid pressure sensing tubes opening at the upstream and downstream faces of said diaphragm with the opening of



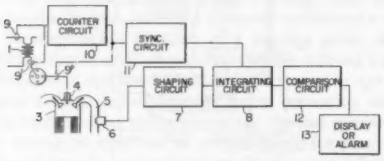
the upstream pressure sensing tube facing the direction of fluid flow, the opening of the downstream pressure sensing tube facing laterally and at least partly downstream relative to the fluid flow, the pressure sensing tubes being connectable to a differential pressure indicating or recording instrument from which a fluid measurement can be derived.

4,040,294

APPARATUS FOR DETECTING MISFIRE IN MULTICYLINDER INTERNAL COMBUSTION ENGINE

Yasumasa Matsuda, Hitachi; Ichiro Kimura, Mito; Akio Sagawa, and Tsutomu Hiramatsu, both of Hitachi, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Sept. 29, 1976, Ser. No. 727,852
Claims priority, application Japan, Oct. 3, 1975, 50-118833
Int. Cl.[2] G01M *15/00*
U.S. Cl. 73—117.3 **24 Claims**



1. An apparatus for detecting misfire in a multicylinder internal combustion engine, comprising:

a sound pick-up transducer for converting the exhaust sound in the exhaust passage of said engine into an electric signal;

means for integrating the output of said sound pick-up transducer with a predetermined integration period in synchronism with the rotation of said engine; and

means for comparing the output signal of said integrating means with a reference signal and for delivering an output when the level of the output of said integrating means is lower than that of said reference signal.

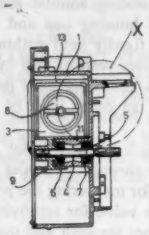
4,040,295

AIR INTAKE FLOWMETER FOR INTERNAL COMBUSTION ENGINES

Peter Romann, Stuttgart, Germany, assignor to Robert Bosch GmbH, Sutttgart, Germany

Filed Oct. 13, 1976, Ser. No. 732,126
Claims priority, application Germany, Oct. 21, 1975, 2547005
Int. Cl.[2] G01F *1/28*
U.S. Cl. 73—228 **2 Claims**

1. In a flowmeter for measuring the air intake flow in an internal combustion engine, including a cast housing, a rectangular flow channel provided therein and a transversely extending baffle plate mounted on a pivotal shaft, the improvement comprising that the baffle plate is substantially trapezoidal-shaped having longer and shorter oppositely disposed parallel



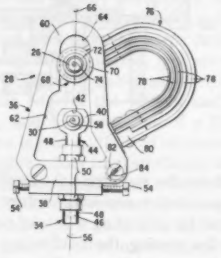
edge portions, the longer of said edge portions lying adjacent said pivotal shaft.

4,040,296

GAS METER TEMPERATURE COMPENSATING TANGENTS

Robert Ritson Douglas, Philadelphia, Pa., assignor to The Singer Company, New York, N.Y.

Filed Sept. 1, 1976, Ser. No. 719,542
Int. Cl.[2] G01F *3/22, 15/04*
U.S. Cl. 73—281 **3 Claims**



1. A temperature compensating tangent device for a gas meter comprising:

a. a tangent block,

b. a tangent arm having a longitudinal axis connected to the tangent block,

c. a crank shaft connected to the tangent arm,

d. a guideway formed in the tangent block in substantial alignment with the axis of the tangent arm,

e. a guide roller directly connected in and shiftable along the length of the guideway,

f. a tangent wrist affixed to the guide roller,

g. a bi-metal member asymmetrically connected between the tangent block and the guide roller, with the tangent block connection being pivotal,

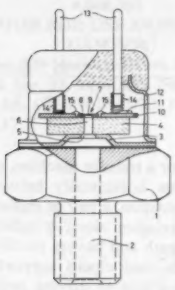
h. the bi-metal member including a plurality of substantially "U" shaped nested bi-metal strips of varying thickness to expand or contract responsive to temperature changes of the gas flowing through the meter, and

i. the bi-metal member to cause the guide roller to continuously move along the guideway to increase or decrease the distance between the tangent wrist and the crank shaft continuously to adjust the position of the tangent wrist relative to the crank shaft.

4,040,297
PRESSURE TRANSDUCER

Mathijs Antonius Karsmakers, and Gerardus Henricus Johannus Somers, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 19, 1975, Ser. No. 633,286
Claims priority, application Netherlands, Dec. 2, 1974, 7415668
Int. Cl.² G01L 9/06
U.S. Cl. 73—398 AR **2 Claims**

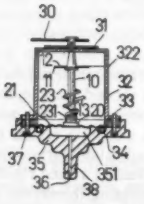


1. A pressure transducer for measuring pressure in a fluid, comprising an insulating holder having a bore therethrough, said bore having a supply end and a measuring end; means for mounting the insulating holder for communicating between said supply end of the bore and a fluid to be measured, comprising a mounting frame assembly having a through bore communicating with said supply end, and a sealing cap hermetically fastened to said frame and having electrical connections passing therethrough; and a pressure sensitive element bonded to the insulating holder and enclosing said measuring end of the bore, said element comprising a semiconductor material formed as a diaphragm having a thickened edge; wherein said insulating holder consists of a hard glass, and wherein said pressure sensitive element is bonded to the holder by thermocompression bonds to an aluminum ring between the holder and the pressure sensitive element.

4,040,298
GEARLESS PRESSURE OR TEMPERATURE GAUGE

Char-Shin Lee, and Hsug-Fang Wang, both of No. 361 Sec. 1 Wanshou Road, Kueishan Hsiang, Taoyuan Hsien, China /Taiwan

Filed Apr. 8, 1976, Ser. No. 674,891
Int. Cl.² G01L 7/08; G01K 5/32
U.S. Cl. 73—406 **7 Claims**



1. A gearless pressure gauge comprising:

a. a housing having a sealed chamber;

b. a diaphragm flexing in response to a change in pressure in said chamber;

c. a cylindrical seat carrying a driving helix mounted thereon and fixed to said diaphragm;

d. a rotary shaft with a transverse pin fixed thereon, said shaft adapted to rotate in accordance with the reciprocation of the driving helix due to diaphragm movement under pressure, with said pin being forced to rotate said shaft under the influence of a caming action with said driving helix;

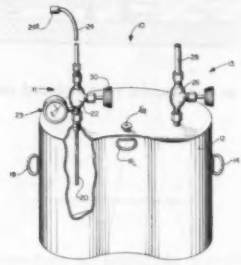
e. a spiral spring providing a restoring force making the rotary shaft rotate to its initial position upon relaxing of said diaphragm; and

f. indicating means connected to said rotary shaft and influenced by the rotation of said rotary shaft for causing a readout proportional to the pressure in said chamber.

4,040,299
AIR SAMPLING APPARATUS

Louis J. Snyder, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed Nov. 13, 1974, Ser. No. 523,342
Int. Cl.² G01N 1/24
U.S. Cl. 73—421.5 R **6 Claims**



1. A personal, portable apparatus worn by an operator for the continuous collection, without operator attention, of a time-weighted gas sample for subsequent analysis which comprises:

a. an enclosed gas reservoir capable of withstanding a pressure differential of about 30 inches mercury;

b. an openable and closeable gas flow means communicating with said gas reservoir for allowing gas to flow from the exterior of said reservoir to the interior of said reservoir at a constant rate when there exists a sufficient gas pressure differential between the exterior and interior of said reservoir so that the passing gas achieves a linear velocity in the throat of said gas flow means equal to the velocity of sound in said passing gas, said reservoir and said gas flow means being sized such that a sample can be obtained over a period up to about 24 hours; and

c. means for attaching the apparatus to the operator.

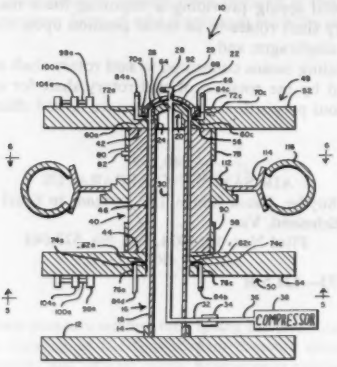
4,040,300
PNEUMATIC WHEEL BALANCING APPARATUS

Donald J. Negard, 129 Cedar Lake Road, North, Minneapolis, Minn. 55405

Filed Feb. 17, 1976, Ser. No. 658,389
Int. Cl.² G01M 1/12, 1/20
U.S. Cl. 73—459 **12 Claims**

1. Wheel balancing apparatus comprising an upright post, a rounded bearing member at the upper end of said post providing a discharge port, means supplying air to said discharge port, a bearing body having a bore encircling a longitudinal portion of said post, the diameter of said bore being slightly larger than that of the portion of said post it encircles whereby tilting of said bearing body changes the clearance between said bearing body and post and said changing clearance causes a change in air pressure between said bearing body and post, means on said bearing body for supporting a vehicle wheel to be balanced, and a balancing mechanism including a domed bearing cap overlying said bearing member, said balancing mechanism being attached to said bearing body and said bal-

ancing mechanism further including means responsive to said air pressure change for sensing when said bearing body has



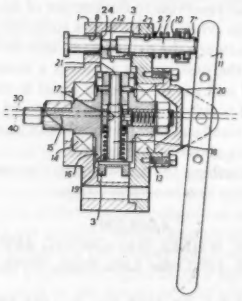
been tilted by an unbalanced wheel placed on said supporting means.

4,040,301

CONTROL DEVICE SENSITIVE TO SPEEDS IN EXCESS OF A PRE-DETERMINED ROTATION SPEED

Armand Rognon, 22 rue Geo-Lufbery, 02300 Chauny, France

Filed Mar. 10, 1976, Ser. No. 665,616
Claims priority, application France, Mar. 27, 1975, 75.09627
Int. Cl.[2] G05G *17/00*
U.S. Cl. 74—3 2 Claims



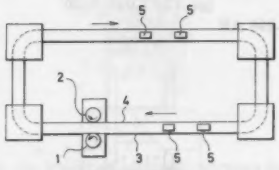
1. Control device sensitive to speeds exceeding a pre-determined rotation speed, comprising a mobile ring arranged for locking a driving organ, a means resiliently biasing said ring to its locking position, a sleeve freely rotating inside said ring at a speed linked to the speed to be controlled and provided with at least one weight, said sleeve being arranged in such manner as, under the action of the centrifugal force created by said predetermined rotation speed, to cause said ring to leave its locking position, characterized in that the sleeve is rotating around a fixed axis and that the weight is a peripheral fly-weight, biased to its rest position by a calibrated spring, and displaceably mounted within the sleeve in such manner as, under the action of said force, to engage with the inner surface of the ring to cause it to leave its locking position.

4,040,302

CHAIN DRIVE FOR A TRANSFER MACHINE

Tadamichi Katarao, Hiroshima, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Japan

Filed Jan. 3, 1975, Ser. No. 538,267
Int. Cl.[2] F16H *19/06*
U.S. Cl. 74—37 4 Claims



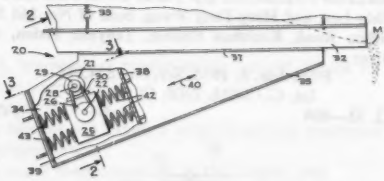
1. A chain drive for a transfer machine, operable to transfer work-carrying pallets horizontally between work stations, comprising, in combination, a pair of endless chains extending in spaced parallel relation along a substantially horizontal workpiece transfer path and having rectilinear sections interconnected by bends, said chains supporting work-carrying pallets; and a driving unit in driving engagement with said chains at a location on a rectilinear section of said transfer path intermediate bends thereof; said driving unit comprising at least one pair of toothed sprockets in the same horizontal plane and each engaged with a respective chain, the lengths of engagement of both chains with their associated sprockets being equal to each other and the sprockets having equal diameters and identical tooth pitches; and driving means conjointly rotating both sprockets of each pair at the same speed to drive the two chains at equal speeds.

4,040,303

TWO MASS VIBRATORY MATERIAL HANDLING APPARATUS AND METHODS OF MANUFACTURING AND FINE TUNING THE SAME

Shinobu Makino, Kamakura, Japan, assignor to FMC Corporation, San Jose, Calif.

Filed Sept. 5, 1975, Ser. No. 610,593
Int. Cl.[2] F16H *33/00*
U.S. Cl. 74—61 4 Claims



1. A two mass vibratory material handling apparatus comprising a first mass, a second mass, and a plurality of resilient elements that interconnect the first and second masses, said first mass including a vibration exciter of the rotary eccentric weight type with an adjustable drive for driving the vibration exciter, said drive including a fixed r.p.m. at full voltage motor with a drive shaft extending therefrom, a driven rotary eccentric weight shaft extending from the exciter, a pulley on the drive shaft of the fixed r.p.m. at full voltage motor, a pulley on the driven rotary eccentric weight shaft, and a drive belt trained about the pulleys, said adjustable drive including means for adjusting the drive ratio of the pulleys to enable the fixed r.p.m. at full voltage motor to drive the driven rotary eccentric weight shaft at a selected operating frequency, said second mass including a trough for supporting an object to be vibrated within the trough, said second mass together with the object to be vibrated being subject to variations in weight, said resilient

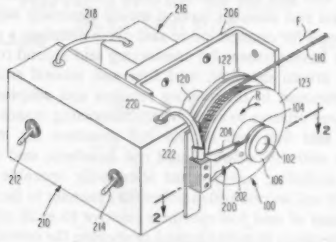
elements providing the sole support for said first mass, said resilient elements having fixed spring rates that influence the natural frequency of vibration for the apparatus in predetermined directions from the vibration exciter to the object to be vibrated, said resilient elements interconnecting the first and second masses including a plurality of steel coil springs located between the vibration exciter and the second mass, said coil springs being aligned longitudinally in a direction parallel with a predetermined line of attack and having a length to mean diameter ratio greater than three.

4,040,304

CLUTCH MOTOR FOR USE IN RESETTABLE FIRE DAMPER

Francis J. McCabe, 239 Hastings Court, Doylestown, Pa. 18901

Filed Apr. 13, 1976, Ser. No. 676,413
Int. Cl.[2] F16D *43/25, 11/10*
U.S. Cl. 74—230.17 T **8 Claims**



1. In a cable-controlled smoke or fire protected system, the apparatus comprising:

a. a base;

b. a motor mounted on said base having at least one one drive shaft;

c. drive plate means mounted on said shaft for rotation therewith, said means comprising an outwardly directed pulley shaft coaxial with said drive shaft and a plurality of outwardly directed drive pins spaced radially apart around the axis of said drive shaft;

d. a pulley mounted for rotation on said pulley shaft, said pulley having a plurality of drive pin slots, at least one for each drive pin, spaced radially apart around the axis of said pulley at positions corresponding to the positions of said drive pins, said pulley having a peripheral portion adapted to receive and coil said cable therearound; and

e. a heat responsive means for moving said pulley between first and second positions along said pulley shaft, said drive pin slots engaging said drive pins in said first position for establishing a positive rotational engagement between said pulley and said drive plate means, whereby activation of said motor tends to coil said cable upon said pulley, said pulley being disengaged from said drive plate means and being rotationally controlled in said second position by said cable to activate said system at least in response to heat.

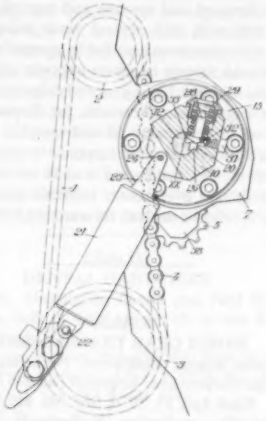
4,040,305

DEVICE FOR TENSIONING A CHAIN

Raymond Cadic, Cherbourg, France, assignor to Societe D'Exploitation Des Procedes Felix Amiot S.E.P.F.A., Paris, France

Filed July 12, 1976, Ser. No. 704,648
Claims priority, application France, July 18, 1975, 75.22580
Int. Cl.[2] F16H *7/10, 7/12*
U.S. Cl. 74—242.15 R **5 Claims**

1. Device for tensioning a chain used for transmitting torque from a first toothed sprocket to a second toothed sprocket, comprising a tensioning element adapted to bear in use against the run of chain to be tensioned, means for supporting and guiding this element in relation to the frame which carries the shafts of the two sprockets and for urging it constantly against the run to be tensioned, the said means comprising two structures and two springs, that is a first structure directly supported and guided by an element fixed to the frame and directly urged by a first spring and a second structure supporting and guiding the tensioning element, supported and guided by the first structure and urged in relation to the latter by a second spring in the same direction as that in which the first spring



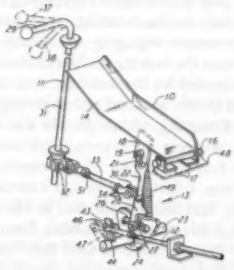
urges the first structure, the amplitude of possible movements of the second structure relative to the first being limited by mechanical abutments, and means being provided between the frame and the first structure for preventing relative displacements of this latter relative to the frame in the opposite direction to that corresponding to the application of the tensioning element against the run of the chain to be tensioned, wherein the two structures are pivotally mounted about the same fixed axis of the frame.

4,040,306

FORWARD AND REVERSE MECHANISM HAVING A SINGLE DIRECTION

Louis Theodore Jensen, Terre Haute, Ind., assignor to J. I. Case Company, Racine, Wis.

Filed Apr. 12, 1976, Ser. No. 676,123
Int. Cl.[2] B60K *20/04;* G05G *11/00*
U.S. Cl. 74—334 **3 Claims**



1. A forward and reverse mechanism having a single direction foot pedal, comprising a pivotally-mounted foot pedal arranged to be operative in a single direction of movement, a member movable in two opposite directions in response to pivotal movement of said foot pedal, and forward and reverse mode mechanism operatively interconnected between said

foot pedal and said member for transmitting movement of said foot pedal to said member, said mechanism including a rotatably-mounted shaft operatively associated with said member for inducing the movement of said member in the two directions, said mechanism including an over-center shiftable assembly operatively interconnected between said foot pedal and said shaft and consisting of a plate and a link, with said plate being mounted on and rotatable with said shaft, and with said link being connected between said plate and said pedal, said plate having three detents in a row therein and respectively corresponding to forward and reverse and neutral modes of said mechanism and with said neutral mode being the centered position of said over-center shiftable assembly and with the other two of said detents being on opposite sides of said centered position, said link having an end disposed in said detents for selective engagement therewith for forward and reverse positions to effect movement of said member in the selected one of the two directions and in response to the single direction of movement of said pedal, and a shift member operatively associated with said over-center shiftable assembly for positioning same in relative neutral, forward, and reverse positions.

4,040,307

WORM GEAR TRANSMISSION

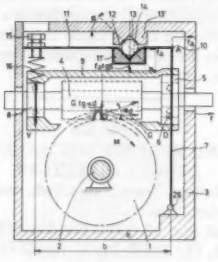
Marinus Pieter Koster, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, Briarcliff Manor, N.Y.

Filed Apr. 27, 1976, Ser. No. 680,963

Claims priority, application Netherlands, May 15, 1975, 7505699

Int. Cl.² F16H 1/16

U.S. Cl. 74—425 **7 Claims**



1. A worm gear transmission comprising a housing, a worm wheel journalled in the housing, two bearings, a pre-load spring, and a worm engaging the worm wheel, rotatably mounted between the bearings, a first of the two bearings being pivotably connected to the housing, and the second bearing being engaged by the pre-load spring arranged to exert a force on the second bearing which presses the worm toward the worm wheel, wherein the transmission comprises means for mounting the first bearing for displacement in the axial direction of the worm, a first member and a second member, means for connecting said second member to the housing rigidly at least in the axial direction of the worm, first coupling means for coupling said first member to said first bearing for displacement in the axial direction of the worm responsive to axial movement of said first bearing, second coupling means for coupling said first member to said second member such that displacement of said first member in said axial direction causes displacement of at least a portion of one of said members in a direction transverse to the worm axis, and means responsive to said transverse displacement for varying the pre-load force of said spring.

4,040,308

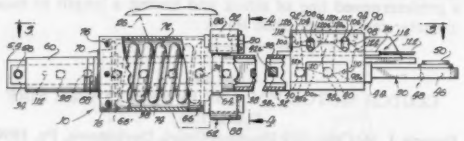
PULL ROD ASSEMBLY

Haim J. Kamner, Palatine, Ill., assignor to Goodman Equipment Corporation, Chicago, Ill.

Filed Jan. 23, 1976, Ser. No. 651,819

Int. Cl.² G05G 3/00

U.S. Cl. 74—586 **10 Claims**



1. A pull rod assembly for use in transmitting reciprocating motion to a driven member from a drive means with said pull rod assembly being alternately subjected to axial forces tending to elongate said rod assembly and axial forces tending to foreshorten said pull rod assembly, said pull rod assembly including a first rod member having means generally adjacent one end thereof for connection to said drive member, a second rod member having means for connecting said second rod member to said driven member, said first and second rod members being disposed in telescoping relation and adapted for axial movement relative to each other, connecting means carried by one of said first and second rod members for interlocking relation with the other of said rod members, said connecting means including pawl means selectively operable to release said first and second rod members in a manner to facilitate axial movement of said rod members relative to each other in first axial directions to either extend or shorten the overall length of said pull rod assembly while preventing movement of said pull rod members in opposite axial directions, and control means operatively associated with said pawl means and adapted to effect selective interlocking of said rod members for unitary movement or to effect selective release of said rod members to facilitate extension or shortening of the overall length of said pull rod assembly.

4,040,309

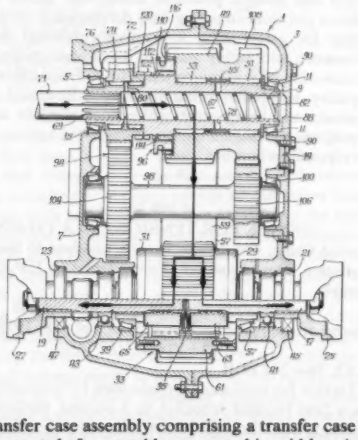
AUTOMATIC TWO-SPEED TRANSFER CASE

Gail E. Wood, and Robert D. Dickmeyer, both of Fort Wayne, Ind., assignors to International Harvester Company, Chicago, Ill.

Filed Feb. 17, 1976, Ser. No. 658,646

Int. Cl.² F16H 37/06, 37/00, 3/02, 37/08

U.S. Cl. 74—665 T **8 Claims**



1. A transfer case assembly comprising a transfer case housing, two output shafts rotatably supported in said housing in a

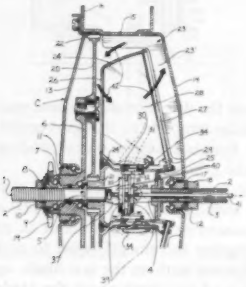
coaxial relation, an input shaft rotatably supported in said housing parallel to said output shafts, a two-way roller clutch disposed between said outer shafts with its two output hubs coupled to the adjacent ends of said two output shafts, a drive sprocket rotatably mounted on said input shaft, chain drive means for directly connecting said drive sprocket to the outer drive member of said two-way roller clutch, speed reduction gear means including a first drive gear rotatably mounted on said input shaft for reducing the speed and increasing the torque applied to said drive sprocket, and clutching means having two positions for selectively coupling in a non-rotational relation said first drive gear to said input shaft in one position and said drive sprocket directly to said input shaft in said second position.

4,040,310

HYDRAULIC TORQUE CONVERTING WHEEL

Pierre Giroux, 3156 de Francheville Street, Trois-Rivieres, Canada

Filed Dec. 1, 1975, Ser. No. 636,619
Int. Cl.[2] F16H *47/08*
U.S. Cl. 74—688 **12 Claims**



1. A hydraulic torque converting wheel comprising a liquid-tight casing operatively containing a hydraulic torque converter liquid, a planetary gear system including a rotary input drive, a planet carrier, planet gears rotatably carried by the latter, a sun gear and a ring gear directly meshing with each of the planet gears independently of each other, said ring gear being secured to said casing, the rotary input drive being secured to the planet carrier for bodily rotation thereof, said planet gears having a greater diameter than that of said sun gear, fins rigidly secured to and inside the liquid-tight casing for bodily rotation with the latter, blades rotatably mounted inside said casing and radially projecting toward operative edgewise registry with the fins, a carrier for said blades rigidly secured to said sun gear for bodily rotation therewith and having said blades angularly adjustable thereon relative to said fins to vary the torque converting relationship with the latter, and a manually-operated remote control system connected to said blades and constructed and arranged to selectively angularly adjust the latter to any desired torque converting relationship of the blades relative to the fins, and to positively maintain said blades in angularly adjusted position despite the action of centrifugal force and/or fluid pressure exerted on said blades, said casing including a peripheral rim and cooperatively forming with the latter a hollow hub, a spindle rotatably carrying said hollow hub, and said liquid-tight casing having axially opposite annular sides centrifugally sealed around the spindle, and wherein said fins include each a main portion extending axially of said spindle and radially relative to the axis of rotation of said casing, shafts are carried by the blade carrier, and said blades are mounted on said shafts respectively and angularly adjustable around the axes defined by the latter for selective angular adjustment relative to said main portion of the fins.

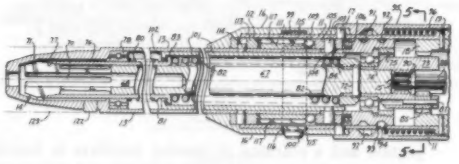
11. A transmission for a bicycle and the like having a power-actuated wheel, comprising a liquid-tight casing forming a hub for said wheel and operatively containing a hydraulic torque converter liquid, a planetary gear system including a rotary input drive, a planet carrier, planet gears rotatably carried by the latter, a sun gear and a ring gear directly meshing with each of the planet gears independently of each other, said ring gear being secured to said casing, the rotary input drive being secured to the planet carrier for bodily rotation thereof, said planet gears having a greater diameter than that of said sun gear, fins rigidly secured to and inside the liquid-tight casing for bodily rotation with the latter, blades rotatable mounted inside said casing and radially projecting toward operative edgewise registry with the fins, a carrier for said blades rigidly secured to said sun gear for bodily rotation therewith and having said blades angularly adjustable thereon relative to said fins to vary the torque converting relationship with the latter, and a manually-operated remote control system connected to said blades and constructed and arranged to selectively adjust the latter to any desired torque converting relationship of the blades relative to the fins and to positively maintain said blades in angularly adjusted position despite the action of centrifugal force and/or fluid pressure exerted on said blades.

4,040,311

DENTAL HANDPIECE

Joe W. Page, Jr., Huntington Beach, and Paul H. Stahlhuth, Mission Viejo, both of Calif., assignors to Joe W. Page, Jr., Huntington Beach, Calif.

Continuation-in-part of Ser. No. 477,803, June 10, 1974, Pat. No. 3,942,392. This application Jan. 2, 1976, Ser. No. 646,069
Int. Cl.[2] F16H *3/44*
U.S. Cl. 74—750 R **15 Claims**



1. A dental handpiece comprising
a first housing barrel,
a second housing barrel movable axially in said first barrel between a first position and a second position,
a motor carried by one of said barrels,
a rotatable chuck carried by the other of said barrels,
a variable speed transmission mechanism intermediate said motor and said chuck,
means responsive to movement of said second barrel axially relative to said first barrel to adjust said transmission to transmit rotation to said chuck at one speed and responsive to movement of said second barrel to said second position to adjust said transmission to transmit rotation to said chuck at another speed, and
chuck control means responsive to relative rotation of said barrels in one direction to close said chuck and responsive to relative rotation of said barrels in the opposite direction to open said chuck.

4,040,312

PLANETARY REDUCTION DRIVE UNIT

Harold B. Tappan, and John Roy Corwin, both of Richmond, Ind., assignors to Eaton Corporation, Cleveland, Ohio

Filed Oct. 29, 1974, Ser. No. 518,667
Int. Cl.[2] F16H *1/28*
U.S. Cl. 74—801 **12 Claims**

1. A reduction drive unit of the type including a fluid motor including a rotating group operable to rotate a shaft means, a sun gear in engagement with said shaft means for rotation therewith, planetary gear reduction means in driven engagement with said sun gear, a fixed ring gear in engagement with said planetary gear reduction means, an output ring gear

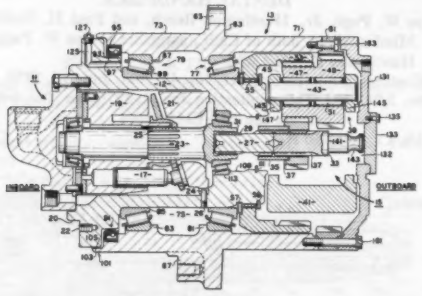
driven by said planetary gear reduction means and a rotating hub assembly mounted for rotation with said output ring gear wherein:

a. said rotating hub assembly includes a wheel mounting flange, a first hub portion extending from said wheel mounting flange to said output ring gear, and a second hub portion extending from said wheel mounting flange toward the inboard end of said unit, oppositely disposed from said first hub portion;

b. said fluid motor including a substantially non-rotatable motor housing surrounding said rotating group, said motor housing being disposed within said second hub portion and terminating, at its outboard end, in a support portion disposed about said shaft means;

c. said second hub portion defining a generally cylindrical internal surface and said motor housing defining generally cylindrical external surface, said external surface including first and second external portions and said internal surface including first and second internal portions, said second portions being disposed between said first portions and said inboard end;

d. bearing means including an inner race engaging said first external portion, an outer race engaging said first internal



portion and a plurality of bearing members in bearing engagement between said inner race and said outer race;

e. oil seal means including a deformable sealing member in sealing engagement with said second external portion and a seal housing seated in engagement with said second internal portion, said second external portion having a diameter sufficiently larger than that of said first external portion to permit removal of said motor housing from within said second hub portion and passage of at least a portion of said bearing means through said deformable sealing member;

f. said internal surface defined by said second hub portion and said external surface defined by said motor housing cooperating to define an annular chamber in communication with the space occupied by said planetary gear reduction means, said annular chamber terminating at said oil seal means;

g. said motor housing defining a passageway in fluid communication between said annular chamber and the exterior of said motor housing; and

h. a pressure relief valve disposed in said passageway and operable to relieve fluid pressure at a pressure substantially below the maximum rated pressure of said oil seal means.

4,040,313

PRECISION CIRCULAR SAW BLADE GRINDING MACHINE

William John Lustgraaf, 124 Glacier Drive, Lolo, Mont. 59847

Filed Dec. 29, 1975, Ser. No. 644,566

Int. Cl.[2] B23D *63/12*

U.S. Cl. 76—37 **21 Claims**

1. A circular saw blade sharpening apparatus, comprising:

an upright supportive framework;

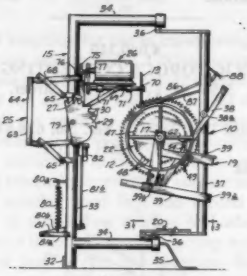
a circular saw blade receiving arbor on the framework;

a circular grinding disc;

drive means for rotating the grinding disc about its center axis;

disc mounting means for holding the disc in a prescribed angular orientation and for mounting the disc to the supportive framework for movement in the prescribed angular orientation so the disc may operatively engage a saw blade mounted on the arbor;

a sawtooth-shaped template on the supportive framework having a sawtooth configuration thereon similar to the configuration of a tooth on a saw blade to be sharpened;



a trace pin on the disc mounting means operatively engageable with the template so that movement of the trace pin over the template causes corresponding tracing movement of the grinding disc;

saw blade indexing means operatively associated with the arbor for enabling selective incremental rotation of a saw blade mounted on the arbor about an arbor axis in prescribed angular increments equal to correct spacing between adjacent teeth on the saw blade regardless of existing spacing of saw teeth about the blade periphery, and wherein the arbor is pivotable relative to the grinding disc about a pivot axis such that a saw blade on the arbor may be set with its planar side surfaces at a selected angle relative to the rotational axis of the disc.

4,040,314

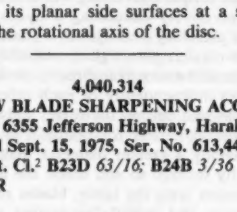
CHAIN SAW BLADE SHARPENING ACCESSORY

Joseph S. Geeck, 6355 Jefferson Highway, Harahan, La. 70123

Filed Sept. 15, 1975, Ser. No. 613,445

Int. Cl.[2] B23D *63/16;* **B24B** *3/36*

U.S. Cl. 76—78 R **13 Claims**



1. A grinder accessory for a bench grinder to adapt the bench grinder to sharpen blades attached to a chain comprising:

securement means for orienting, moving, and holding said chain in a semi-fixed relation to said grinder, and;

holding means for removably relocating said securement means to said grinder, said securement means includes a first shaft means including a first shaft for angularly and longitudinally orienting such blades to said grinder, said holding means includes rotation means for holding said first shaft means and permitting said first shaft to rotate

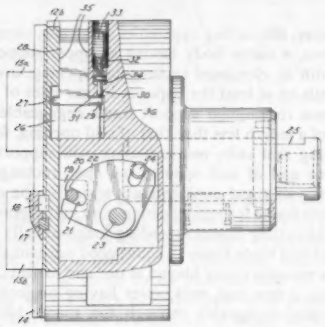
about the axis of said first shaft and setting the longitudinal orientation of such blades, said longitudinal orientation providing the spacing between said rotation means and said wheel to place said blades opposite said grinder, and wherein said first shaft includes a locking dog pivotably mounted on said first shaft having a locked and unlocked position, and said rotation means includes a bushing, said bushing having means including an end surface of said bushing for holding said locking dog in said locked position of said locking dog.

4,040,315

MACHINING CROSS-FEED HEAD COUNTERWEIGHT SYSTEM

Robert Aldred Bellingham, Southfield, Mich., assignor to The Valeron Corporation, Oak Park, Mich.

Filed May 24, 1976, Ser. No. 688,957
Int. Cl.[2] B23B *3/00, 3/04*
U.S. Cl. 82—2 E **7 Claims**



1. A machining cross-feed head comprising;
a rotary body,
parallel cross slide means on opposite sides of rotational center of said body, each with a tool block for mounting a cutting tool,
means for simultaneously feeding said tool blocks radially across said body,
individual counterweight means having a connection with each tool block cross slide operative to reduce the effective centrifugal force on said tool blocks through at least a portion of their travel
and stop means on said body rendering said counterweight means ineffective after a predetermined partial radially inward movement of said tool block has occurred.

4,040,316

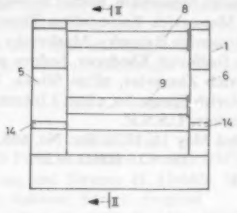
LATHE BED

Herbert Gramespacher, and Armin Feisel, both of Schaffhausen, Switzerland, assignors to Georg Fischer Aktiengesellschaft, Switzerland

Filed Mar. 16, 1976, Ser. No. 667,353
Claims priority, application Switzerland, Mar. 27, 1975, 3950/75
Int. Cl.[2] B23B *17/00*
U.S. Cl. 82—32 **5 Claims**

1. A lathe bed comprising
a concrete supporting body having spaced apart wall portions integrally formed thereon;
a generally rectangular frame having two side members at opposite ends thereof, said frame including means extending between side members defining parallel track members for supporting and guiding a tool carrier,
said track members being fixedly connected to both of said end members,
said frame being torsionally flexible when apart from said support body; and
means for rigidly connecting said side members of said frame to said spaced apart wall portions of said body to render said frame substantially torsionally inflexible.

4. A lathe bed comprising
a concrete supporting body having first and second spaced-apart wall portions integrally formed thereon;
a generally rectangular frame having two ends, said frame including
an elongated box-like side member at one end of said ends, and



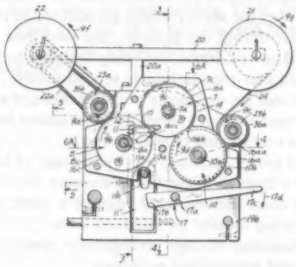
first and second parallel column guide members fixedly attached at one end to said side member and extending perpendicularly from said side member for supporting and guiding a tool carrier,
said frame being torsionally flexible when apart from said body; and
means for fixedly attaching said side member to said first one of said spaced-apart wall portions,
the other end of each of said column members being directly and fixedly attached to said second one of said wall portions on said body to render said frame substantially torsionally inflexible.

4,040,317

FILM TRIMMING DEVICE

Paul A. Kiejzik, Motion Technology Corp., Mount Pleasant Drive, Aston, Pa. 19014

Filed Sept. 21, 1976, Ser. No. 725,277
Int. Cl.[2] B26D *3/12*
U.S. Cl. 83—56 **12 Claims**



12. A method for trimming an edge margin from a tape, comprising drawing a tape between contacting radially outward circular circumscribing surfaces of opposing first and second rollers, positioning the tape being drawn therebetween, with a predetermined width of a margin thereof positioned beyond corresponding side faces of the first and second rollers, and as tape is being drawn therebetween, positioning a cutting edge directed in a counter-direction to the drawing-direction of the tape and gradually pressing the cutting edge against an outer side of the margin to be trimmed whereby the cutting

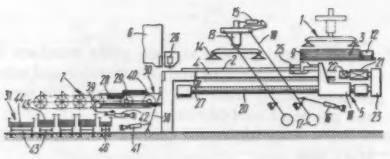
edge slices into and trims the predetermined width, the cutting edge being thereupon pressed against said corresponding side faces at a point of said drawing.

4,040,318

TRANSFER MACHINE FOR CUTTING ROLLED SHEET METAL

Boris Anatolievich Makeev, ulitsa Novgorodskaya, 6, kv. 29; Lev Mikhailovich Stepochkin, ulitsa Chernoglazovskaya, 11a, kv. 9; Garri Moiseevich Korot, ulitsa Timurovtsev, 25a, kv. 100; Vadim Ivanovich Batozsky, Moskovsky prospekt, 28, kv. 21; Alexandr Iosifovich Khodorov, Sadovy proezd, 1, kv. 89; Vitaly Ivanovich Zhuravlev, ulitsa Slinka, 14a, kv. 50, and Adolf Grigorievich Eremenko, ulitsa 3 Internatsionala, 17, kv. 24, all of Kharkov, U.S.S.R.

Filed May 14, 1976, Ser. No. 686,554
Int. Cl.[2] B26D *5/20*
U.S. Cl. 83—71 **4 Claims**



1. A transfer machine for cutting sheet metal comprising:

a. a frame with longitudinal members, said frame being composed of several sections located successively along the axis of said machine and designed for mounting respective units thereof;

b. a sheet-loading arrangement including a first receiving table for sheets fixedly mounted on said frame and located on said axis, and a four-member linkwork having a sheet grip, said linkwork being mounted on said frame via supports secured to said frame;

c. guillotine shears located on said axis downstream of said first receiving table as viewed in the direction of sheet movement;

d. a feed table located between said first receiving table and said shears, said linkwork being constructed so as to transfer a sheet from a stack onto said feed table in such a manner that the sheet remains parallel to the plane of said feed table during the transfer, and said feed table being mounted on said frame and being designed to feed a sheet from said first receiving table to said shears;

e. a first sensor for measuring the dimensions of a blank from the forward edge of a sheet, said first sensor being located near the cutting line of said shears;

f. a second sensor responsive to the passage of the rearward edge of a sheet and designed to measure the dimensions of a blank from the rearward edge of a sheet, said second sensor being located on said feed table;

g. a multisection storage arrangement positioned slightly below said longitudinal members;

h. an arrangement for sorting and stacking cut-off blanks and including a second receiving table for intermediate storage of like blanks located downstreams of said shears and upstream of said storage arrangement as viewed in the direction of sheet movement, a trolley designed to transport like blanks and adapted for movement along said axis on said longitudinal members, and a discharge mechanism on said trolley designed to discharge cut-off blanks into said storage arrangement; and

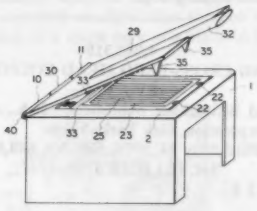
i. a system for programmed control of said machine.

4,040,319

CUTTER FOR CUTTING VEGETABLES AND FRUITS, THE CUTTER HAVING BLADES THAT ARE MOVABLE AT THE TIME OF CUTTING

Masayo Taniyama, 1347 Fuchu, Wakayama, Wakayamaken, Japan

Filed Oct. 15, 1975, Ser. No. 622,736
Int. Cl.[2] B26D *4/06, 5/22*
U.S. Cl. 83—425.3 **5 Claims**



1. A cutter, for cutting vegetables and fruits, comprising, in combination, a cutter body having an upper support surface formed with an elongated rectangular opening; inwardly extending rails on at least the opposite longer sides of said opening; an open rectangular support frame engageable with said rails and of a length less than that of said opening, for reciprocation along said rails; means biasing said support frame to engage one end of said opening; an open rectangular blade frame removably and conformingly seated in the opening of said support frame for reciprocation with said support frame; a plurality of cutting blades extending longitudinally across the opening of said blade frame in equispaced substantially parallel relation; a pressing cover hinged at one end to said cover body and having a free end, said cover having projections on its inner surface engageable through the spaces between said cutting blades; and cooperating cam means on the free end of said cover and on an end of said support frame interengageable upon swinging of said pressing cover toward said support surface to move said support and blade frames toward the opposite end of said rectangular opening in said support surface against the bias of said biasing means; whereby, when a fruit or vegetable to be cut is placed on said cutting blades with said cover open, and said cover is swung toward said support surface, the projections on said cover press the fruit or vegetable against and between said cutting blades, and said cutting blades are moved longitudinally to effect slicing of the fruit or vegetable.

4,040,320

PUNCHING MACHINES

Jean Cloup, 33360, Latresne, France

Filed Nov. 11, 1975, Ser. No. 631,158
Claims priority, application France, Dec. 26, 1974, 74.42895
Int. Cl.[2] B26D *5/02*
U.S. Cl. 83—527 **7 Claims**

1. A punching machine for use in punching holes in the sides of a shape comprising:

a frame;

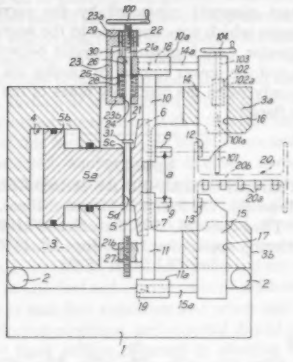
a press forming punch closing control means having a fixed portion integral with the frame of the machine and having a mobile platform;

two generally C-shaped assemblies including at least two arms carried by the frame juxtaposed and disposed symmetrically in relation to each other; each assembly comprising a first part which constitutes one arm of a C-shape assembly bearing a punching tool and which is mounted axially and slidably on said mobile platform of said press and a second part which constitutes the other arm of said C-shape assembly and which is mounted axially and slidably on the frame parallel to the sliding axis of the said first part;

connecting means provided to interconnect each of the said first parts to the corresponding second part;

means provided for controlling the forward movement of said punch tool;

means provided for regulating and maintaining said assemblies in a working position, with a predetermined spacing of said punch tools, said C-shape assemblies being guided within said machine in such a way that said C-shape assemblies can be displaced and moved further from each other; and



means for controlling and positioning said C-shape assemblies, firstly, in a working position in which the position of one of said punch tools is maintained at a predetermined distance from a guide plane coinciding with a guiding surface on the shape to be punched and in which the spacing of the tools is maintained at a predetermined value, and secondly in a position to rotate the shape to be punched such that each of said C-shape assemblies is displaced in relation to its working position in the sense of an increase in the distance separating said assemblies.

4,040,321

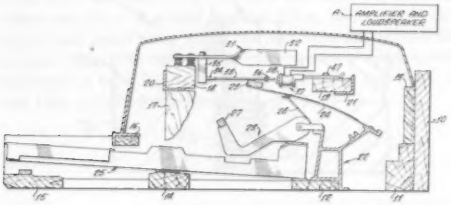
ELECTROMAGNETIC PICKUP AND METHOD FOR TINE-TYPE ELECTRIC PIANO, AND PIANO INCORPORATING SUCH PICKUP

Seth E. Lover, Garden Grove, Calif., assignor to CBS Inc., New York, N.Y.

Filed July 18, 1975, Ser. No. 597,084

Int. Cl.[2] G10H *3/00*; H04M *1/00*

U.S. Cl. 84—1.15 **43 Claims**



1. A tine-type electromechanical musical instrument, which comprises:

a. a tine or reed one end portion of which is fixed and the remaining portion of which is free to vibrate in a predetermined direction,

b. magnetic means including a protuberance to generate in the air in the region of said protuberance a magnetic field which is asymmetrical with respect to said protuberance, said means being such that the lines of force in said magnetic field loop back instead of following a substantially closed low reluctance magnetic circuit including a tine or reed,

said means causing said asymmetry of said magnetic field to be such that the magnetic field strength along a hypothetical straight line which extends through the air past said protuberance is relatively high adjacent one side of said protuberance and relatively low adjacent the other side thereof,

c. means to mount said magnetic means in such relationship to said tine that said hypothetical line is parallel to said predetermined direction of vibration, and also in such relationship to said tine that a part of said free tine portion is disposed in said magnetic field,

d. means to set said free tine portion into vibration in said predetermined direction, and

e. means associated with said magnetic means to generate an electrical signal in response to said vibration of said part in said field.

4,040,322

BOWS FOR MUSICAL INSTRUMENTS

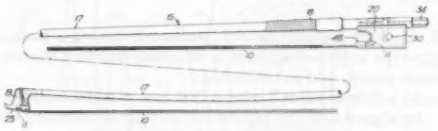
Raymond Parkyns, and Terence H. Hubble, both of 39 Craddocks Avenue, Ashtead, Surrey, England

Filed Nov. 21, 1975, Ser. No. 634,092

Claims priority, application United Kingdom, Nov. 29, 1974, 51856/74

Int. Cl.[2] G10D *1/02, 3/00*

U.S. Cl. 84—282 **6 Claims**



1. A self-contained unit for the re-stringing of a bow for a musical instrument, said unit comprising a hank of reorientated monofilaments each said monofilament containing at least a substantial proportion of polyvinyl chloride and having a diameter in the range of 0.15 to 0.40 m.m, the adjacent free ends of said monofilaments being bonded together and an enlargement at each end of said hank, said enlargement being formed by said bonded monofilaments.

4,040,323

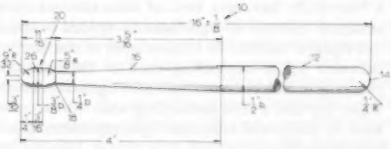
SYNTHETIC MATERIAL DRUMSTICK

Gregory G. Kline, 1437 W. Philadelphia, York, Pa. 17404

Filed Feb. 10, 1976, Ser. No. 656,960

Int. Cl.[2] G10D *13/00*

U.S. Cl. 84—422 S **2 Claims**



1. A synthetic material drumstick formed from solid polyester resin reinforced with glass roving fibers, said drumstick having a butt end and a substantially straight cylindrical portion forming a handle extending forward from said butt end approximately three-fourths the length of said drumstick, the opposite end of the drumstick comprising a head end integrally extending forward from the end of the handle opposite the butt end thereof approximately one-fourth the length of said drumstick, said head end being substantially in the form of a straight elongated truncated conical section terminating in a neck integrally connected to a tip on the forward end of said head,

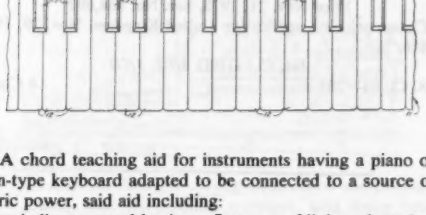
the neck of said truncated conical portion being substantially one-half the diameter of said handle, and said tip having an intermediate cylindrical portion substantially three-quarters the diameter of said handle and has a length approximately one-fourth that of said tip, the outer end of said tip being smoothly rounded and the portion of said tip between said intermediate cylindrical portion and said neck being tapered in a smoothly rounded shape.

4,040,324

CHORD INDICATOR FOR INSTRUMENTS HAVING ORGAN AND PIANO-TYPE KEYBOARDS

Harry Green, 11848 - 99 Ave., Surrey, British Columbia, Canada

Filed Apr. 12, 1976, Ser. No. 676,243
Int. Cl.[2] G09B *15/00*
U.S. Cl. 84—478 **4 Claims**



1. A chord teaching aid for instruments having a piano or organ-type keyboard adapted to be connected to a source of electric power, said aid including:

a. an indicator panel having a first row of lights adapted to be aligned with the keys of the instrument extending over two octaves,

b. the lights representing the black keys indicating the black keys as sharps,

c. a second row of electric lights on the indicator panel representing only the black keys indicating the black keys are flats,

d. lead means separately grounding each of the indicator lights representing white keys,

e. electrically operated relay switch means connectable to the power source adapted when in a deenergized condition for connecting all the indicator lights of the first row representing black keys to ground, and in an energized condition adapted to connect only the indicator lights of the second row indicating that the black keys are flats to ground,

f. a chord selector assembly operable remote from the indicator panel for connecting the indicator lights to the source of electric power, said assembly including:

i. a base plate having a row of base contact elements arranged thereon in equidistantly spaced relationship and equal in number to total number of the first row of indicator lights connecting each of the base contact elements to its associated indicator lights representing a white key and a lead connecting each contact element with its associated indicator light representing a black instrument key,

ii. a carriage mounted for slidable movement over the base plate longitudinally of the row of spaced contact elements thereon,

iii. a row of contact elements on the carriage connectable in circuit to the power source for slidably contacting the base contact elements, said carriage contact elements being equal in number to the total number of notes required to be played for the selected chord and being so spaced so that when a first carriage contact element is positioned over any base contact element which represents the chord root note, the remainder of the carriage contact elements contact the base contact elements which represent the total number of notes,

iv. a plurality of normally open chord selector switches mounted on the carriage for connecting selected carriage contact elements in circuit with one side of the power source, each switch representing one of the selected chords and being adapted when operated from the open to closed position to connect those carriage contact elements representing the notes of any chord selected to the source of electric power so as to energize the indicator lights associated with any of the base contact elements contacted by the carriage contact elements which are connected to the source of power,

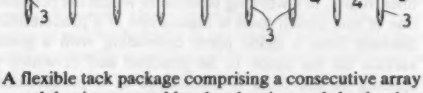
g. flat selector switch means in circuit between the relay switch and the power source for closing the relay switch circuit only when the black key notes of the chord selector are flats.

4,040,325

TACK-STRIP AS OBTAINED BY HEAD-CEMENTING

Umberto Monacelli, Via Parini 6, Monza (Milan), Italy

Filed June 28, 1976, Ser. No. 700,108
Claims priority, application Italy, June 26, 1975, 24811/75
Int. Cl.[2] F16B *15/08*
U.S. Cl. 85—17 **4 Claims**



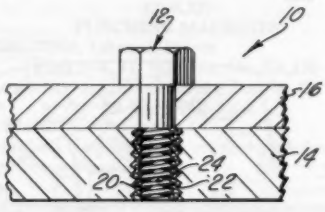
1. A flexible tack package comprising a consecutive array of tacks, each having a round head and an integral shank substantially smaller in diameter than the associated head, and means separably connecting only the heads of adjacent tacks to each other, characterized in that said connecting means comprises drops of a hot melt adhesive positioned between consecutive tack heads.

4,040,326

FASTENER ASSEMBLY

Arthur R. Breed, 12900 Lake Ave., Lakewood, Ohio 44107

Filed Mar. 3, 1975, Ser. No. 554,397
Int. Cl.[2] F16B *37/12, 39/28*
U.S. Cl. 85—32 CS **7 Claims**



1. An assembly comprising a generally helical internal thread convolution having leading and trailing flank surfaces extending between crest and root portions of said internal thread convolution, a generally helical external thread convolution at least partially disposed within said internal thread convolution and having leading and trailing flank surfaces extending between crest and root portions of said external thread convolution, said external thread convolution having a crest diameter which is less than the crest diameter of said internal thread convolution to provide a space between adjacent crests of said internal and external thread convolutions, a

generally helical insert having a plurality of turns disposed between said internal and external thread convolutions and having a generally helical central axis extending through each of said turns, said insert having a generally polygonal cross sectional configuration in a radically extending plane with first and second pairs of side surfaces, said insert being resiliently twistable about said helical central axis from a first condition to a fully deflected condition under the influence of torsion forces applied to said insert by said internal and external thread convolutions, said internal thread convolution having a first flank surface disposed in abutting engagement with a first side surface of said first pair of side surfaces on said insert and a second flank surface spaced apart from said insert when said insert is in said first condition, said first flank surface of said internal thread convolution being spaced apart from said insert and said second flank surface of said internal thread convolution being disposed in abutting engagement with a first side surface of said second pair of side surfaces on said insert when said insert is in said fully deflected condition, said first side surfaces of said first and second pairs of side surfaces at least partially defining an included angle which is less than the included angle between said first and second flank surfaces of said internal thread convolution to provide space between one of said flank surfaces of said internal thread convolution and one of said first side surfaces of said first and second pairs of side surfaces when said insert is in said first condition and when said insert is in said fully deflected condition, said external thread convolution having a first flank surface disposed in abutting engagement with a second side surface of said first pair of side surfaces on said insert and a second flank surface spaced apart from said insert is in said first condition, said first flank surface of said external thread convolution being spaced apart from said insert and said second flank surface of said external thread convolution being disposed in abutting engagement with a second side surface of said second pair of side surfaces on said insert when said insert is in said fully deflected condition, said second side surfaces of said first and second pairs of side surfaces at least partially defining an included angle which is less than the included angle between said first and second flank surface of said external thread convolution to provide space between one of said flank surfaces of said external thread convolution and one of said second side surfaces of said first and second pairs of side surfaces when said insert is in said first condition and when said insert is in said fully deflected condition, said helical central axis of said insert being shiftable relative to said internal and external thread convolutions upon twising of said insert from the first condition to the fully deflected condition, said helical central axis of said insert being spaced further from said first flank surfaces of said internal and external thread convolutions when said insert is in said fully deflected condition than when said insert is in said first condition, said helical central axis of said insert being spaced further from said second flank surfaces of said internal and external thread convolutions when said insert is in said initial condition than when said insert is in said fully deflected condition.

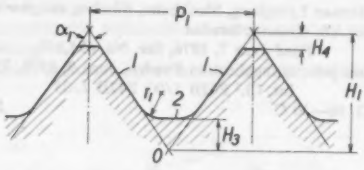
4,040,327

HIGH FATIGUE SCREW THREADS

Hideyuki Otaki, Mitaka, Japan, assignor to Agency of Industrial Science and Technology, Tokyo, Japan

Filed Sept. 19, 1975, Ser. No. 614,772
Claims priority, application Japan, Sept. 20, 1974, 49-108572
Int. Cl.² F16B *33/02*
U.S. Cl. 85—46 **1 Claim**

1. A substantially symmetric screw thread system including external threads each profiled to have a flank angle of (70 ± 2)° and a flat root located at (0.27 ± 0.02)H, from an intersecting point of two lines extended from opposing flanks of two adjacent threads and connected to said opposing flanks



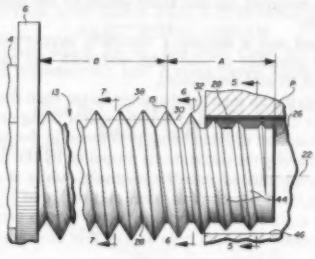
through arcs of a radius (0.15 ± 0.02)p where H is the depth and p is the pitch of the threads.

4,040,328

THREAD-FORMING FASTENER HAVING DUAL LOBULATION AND DIES FOR MAKING THE SAME

Herman G. Muenchinger, South Dartmouth, Mass., assignor to Research Engineering & Manufacturing, Inc., New Bedford, Mass.

Filed Mar. 10, 1976, Ser. No. 665,537
Int. Cl.² B21D *17/04;* **F16B** *25/00, 39/30*
U.S. Cl. 85—46 **8 Claims**

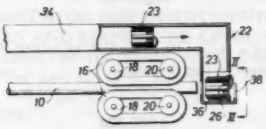


1. A thread-forming fastener having a work-entering section and a work-holding section, each section having more than one thread turn, a continuous roll thread on both said work-entering and work-holding sections, the thread formation on said work-entering section being tapered and having a pitch cross section in the form of a generally arcuate polygon with an odd number of arcuate sides merging gradually with intermediate thread-swaging lobes, the thread formation on said work-holding section also having a pitch cross section in the form of a generally arcuate polygon with an odd number of arcuate sides merging gradually with intermediate lobes, the number of sides and lobes in said holding section being respectively the same as the number of sides and lobes in said work-entering section, the radii of curvature of the sides in each section being substantially greater than the radii of curvature of the lobes in that section, and the lobulation in the holding section being substantially less than the lobulation in said work-entering section, said lobulation being defined as the maximum distance from the crest of the thread at an arcuate side to the circle that inscribes the crests of the thread at the adjacent lobes, the lobulation in said work-entering end being sufficient to provide a low torque thread-forming action in a workpiece, the lobulation in the holding section being a sufficient departure from a circular configuration to enhance in the holding section thread a locking action and an increase in the stripping torque when threaded into such workpiece, and a pilot thread section on said work-entering section intermediate the larger end of the tapered thread formation and the work-entering tip of the fastener for aligning the axis of the fastener with the axis of a hole in a workpiece when the pilot thread is inserted therein, said pilot thread section having a crest cross section of substantially uniform width throughout 360° and extending for at least approximately one thread turn.

4,040,329
METHOD AND ARRANGEMENT FOR CHARGING OF SHOTHOLES

Sten Herman Ljungberg, Stockholm, Sweden, assignor to Nitro Nobel AB, Gyttorp, Sweden

Filed June 7, 1976, Ser. No. 694,100
Claims priority, application Sweden, June 9, 1975, 7506593
Int. Cl.[2] F42B 3/00; F42D 1/08
U.S. Cl. 86—20 C 5 Claims



1. Apparatus for charging a shothole with explosive and a detonator, comprising

a stand,

an elongate, flexible charging tube mounted on said stand, means operable for inserting said tube into a shothole,

a retainer mounted on said stand ahead of the front end of said tube,

roll of cord and a detonator assembly supported on said retainer coaxially of said tube, and with one end of said cord tied to said detonator,

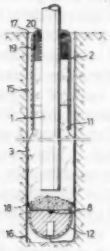
said roll having an internal diameter larger than the external diameter of said tube, and said detonator being centered in the bore in said roll and being positioned in the path of the tube, whereby the detonator is propelled by the tube as the latter is introduced into the shothole, while at the same time the cord is unwound from said roll, and

a guiding device on said retainer operative to compel said roll to rotate about its own axis as it is unwound.

4,040,330
METHOD OF CHARGING DRILL HOLES AND MEANS FOR CARRYING OUT THE METHOD

Nils Denny Matzén, Damastvagen 6a, S-16148, Bromma, Sweden

Filed Dec. 23, 1975, Ser. No. 643,813
Claims priority, application Sweden, Dec. 30, 1974, 7416357
Int. Cl.[2] F42D 1/08
U.S. Cl. 86—20 C 4 Claims

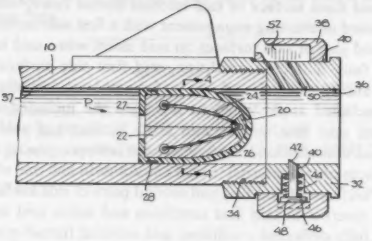


4. A method of charging a drill hole with explosives, comprising the steps of: preparing a sleeve open at both ends, preparing a thin-walled stocking of flexible material open at both ends, connecting one end of said stocking to one end of said sleeve and folding said stocking into a bellows around said sleeve from said one end towards said other end, folding said stocking over said bellows, closing said other end of said stocking after it has been drawn over said bellows and said other end of the sleeve, introducing a charging hose into the sleeve, introducing said charging hose, sleeve and stocking into said drill hole, and introducing explosives through said charging hose while the thin-walled stocking straightens out fold by fold from said bellows.

4,040,331
DUAL PURPOSE PROJECTILE AND WEAPON COMBINATION

Alan Litman, Pittsburgh, Pa., assignor to Smith & Wesson Chemical Company, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 485,560, July 3, 1974, abandoned. This application Dec. 22, 1975, Ser. No. 643,052
Int. Cl.[2] F41C 21/18
U.S. Cl. 89—14 C 16 Claims



1. The combination of a dual purpose projectile and a weapon for firing the projectile comprising:

a body including a plurality of body segments, means securing said segments one to the other for movement between first and second configurations, said projectile body in said first configuration having a longitudinal axis with said segments being disposed in close juxtaposition one to the other about said axes and forming a substantially bullet-shaped projectile body having a predetermined diameter, said projectile body in said second configuration having a predetermined point with said segments being disposed radially from said point and forming a projectile body having a diameter larger than said predetermined diameter affording increased frontal area in a direction normal to the trajectory of the projectile when fired from the weapon, and means for releasably retaining said segments in said first configuration,

means carried by said weapon and cooperable with said projectile for selecting before firing said weapon one of said first and second projectile configurations whereby said projectile obtains either said first configuration or said second configuration after being fired from said weapon,

and means cooperable with said selecting means for venting said weapon only when said second projectile configuration is selected.

4,040,332
VARIABLE SPRING RATE EQUILIBRATORS

Robert O. Border, Bettendorf, Iowa, and Ronald H. Rudman, Chatsworth, Calif., assignors to The United States Government as represented by the Secretary of the Army, Washington, D.C.

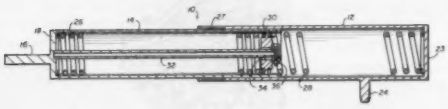
Filed May 24, 1976, Ser. No. 689,322
Int. Cl.[2] F41F 21/16
U.S. Cl. 89—37 F 3 Claims

1. An equilibrator assembly for a weapon system having a set of tipping parts pivotable in elevation relative to a fixed mount including an expandible housing pivoted between the tipping parts and the mount, and a plurality of coaxially aligned spring means in the housing cooperable to expand in response to the increased elevational position of the tipping parts to compensate substantially for the weight load demands of the tipping

parts caused by variation in the location of the center of mass of the tipping parts throughout its range of elevation and depression.

a floating piston interposed between two of said spring means,

said housing having two sections with one section telescopically movable in the other section in response to elevation and depression of said tipping parts, and



an elongated stop member carried by said housing and engageable with said floating piston to prevent further expansion of one of said spring means when the tipping parts have reached a predetermined angle of elevation,

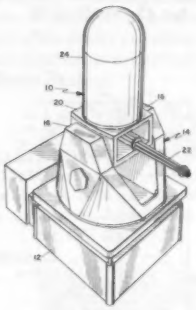
said stop member extending through a bore in the floating piston and having an enlarged head for preventing movement of said piston when the tipping parts reach a predetermined angle of elevation.

4,040,333

ISOGRID SHELL GUN MOUNT

Paul Slysh, San Diego, Calif., assignor to General Dynamics, Pomona, Calif.

Filed Oct. 18, 1976, Ser. No. 733,662
Int. Cl.[2] B64D *7/06*
U.S. Cl. 89—37.5 R **19 Claims**



1. High strength load bearing shell structure comprising:

means defining a substantially circular base;

alternate flat and curved wall panels arranged circumferentially around and extending upwardly from said base;

said panels defining wall means converging inward from said base to the top and secured to plate means extending substantially parallel to said base;

said adjacent panels being secured together along lines that run at an angle to said base; and

each of said panels having an outer skin structure and an inner isogrid structure.

4,040,334

MISSILE LAUNCHER FOR AIRCRAFT

Rollo G. Smethers, Jr., Atlanta, Ga., assignor to Lockheed Aircraft Corporation, Burbank, Calif.

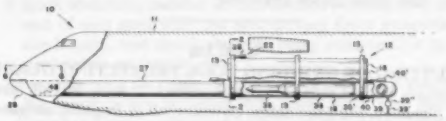
Filed Apr. 20, 1976, Ser. No. 678,557
Int. Cl.[2] F41F *3/06*
U.S. Cl. 89—1.804 **10 Claims**

1. A missile launcher for aircraft comprising:

at least one tube mounted internally of said aircraft and adapted to contain a missile to be ejected therefrom, each said missile tube being sized internally to the transverse dimension of the aft end of said missile and adapted to be disposed in axial alignment with an opening in the forward end of said aircraft;

a removable and replaceable closure associated with said opening;

a chamber at the aft end of said missile tube, the interior of



which is in communication with the end of the adjacent missile tube aft of said missile therein;

a source of fluid under pressure in excess of that in said each adjacent missile tube forwardly of said missile;

a conduit connecting said chamber with said fluid source; and

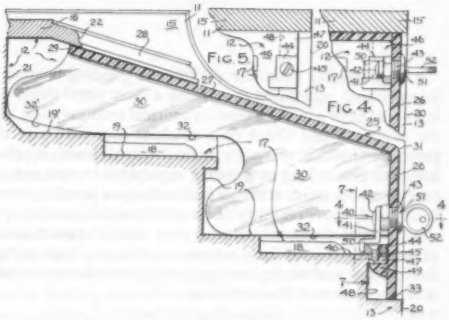
a valve associated with said conduit to control the passage of said fluid from said source into the adjacent chamber.

4,040,335

COVER AND LOCK FOR KEYBOARD OF AN ELECTRONIC ORGAN

Ray J. Oliver, 451 S. 1st St., San Jose, Calif. 95113, and Stanford M. Sammarcelli, 1357 Loyola Drive, Santa Clara, Calif. 95051

Filed Feb. 17, 1976, Ser. No. 658,179
Int. Cl.[2] G10C *3/02*
U.S. Cl. 84—183 **7 Claims**



1. For the keyboard of a musical instrument such as an electronic organ and the like having a plurality of groups of keys arranged in steps from its front to its back, a cover comprising in combination:

1. a keyboard compartment having a bottom, side walls and a top member at the back end of such keyboard compartment for confining the keyboard;
2. a sheet of rigid plastic material having side ends engaging the side walls of said keyboard compartment;
3. said plastic material having an upper portion disposed at an inclination substantially conforming to the steps of the groups of keys on said keyboard with its upper end engaged under the top member of the keyboard compartment;
4. said plastic material having a front portion formed integrally with said upper portion disposed vertically adjacent the front edge of the keyboard and having a lower edge adapted to rest upon the upper surface of the bottom of the keyboard compartment for supporting the cover over the keyboard;
5. a forwardly projecting ledge on the first step of said

keyboard engaging said vertically disposed front portion of the sheet of plastic material;

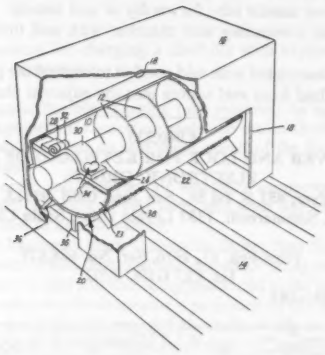
6. a detent formed on the back face of said front portion projecting below said forwardly projecting ledge for engaging the underside of the latter; and
7. a latch mechanism between the vertically disposed front portion of said sheet of plastic material and the upper surface of said forwardly projecting ledge for securing said cover to the keyboard;

4,040,336

CUTTING OR GRINDING TOOL PROTECTING GUARD

Terence John Lewis, Rugby; Raymond Brooks, Exhall, near Coventry, and John Selby, Coventry, all of England, assignors to The Torrington Company Limited, Coventry, England

Filed July 26, 1976, Ser. No. 676,525
Int. Cl.[2] B23Q *11/06*; B27G *19/02*
U.S. Cl. 90—11 R **4 Claims**



1. A protective guard for a cutting or grinding member of a machine tool, said guard comprising a sheet metal shield defining a trough of generally semi-cylindrical configuration, means for mounting said shield on a machine tool with said shield pivotally movable between a first, guard position wherein access to the cutting or grinding member is barred and a second, access position wherein said cutting or grinding member is exposed; and a plurality of circularly spaced, radial projections on said shield for pivoting said shield between said two positions responsive to workpiece advancing and retracting movements, said workpiece being held in a holder mounted for movement on said machine tool.

4,040,337

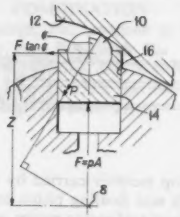
MULTI-LOBE CAM FOR HYDRAULIC PISTON-AND-CYLINDER MACHINES

Kenneth William Samuel Foster, Prestbury, England, assignor to Renold Limited, Manchester, England

Continuation-in-part of Ser. No. 412,074, Nov. 2, 1973, abandoned. This application May 28, 1975, Ser. No. 581,694
Int. Cl.[2] F01B *13/06*
U.S. Cl. 91—491 **15 Claims**

1. An hydraulic piston and cylinder machine having a given speed range, comprising a cylinder block defining a plurality of cylinders, a plurality of pistons slidably mounted in respective cylinders, piston follower elements associated with said pistons, means for supplying fluid to and for venting fluid from said cylinders, a multi-lobe cam to control the displacement of the pistons and piston follower elements in the cylinder block with respect to the progression of the cylinder block along the direction of the cam, and a drive shaft when the machine is operated as a motor,

the cam being shaped to provide a constant output torque at the motor drive shaft at an intermediate speed in said given speed range of the machine and so that all points of operation, in the cycle of events constituting each constant torque producing cycle of the machine, the mathematical output of the torque from the cam comprises two parts, the first part being a component of the torque to provide the torque dissipated in friction between the pistons and piston follower elements on the one hand and the



pistons and cylinders on the other hand in the motor while producing the output torque, and the second part being a component of the torque required from that part of the cam being its contribution at that instant to said constant torque output required at the motor drive shaft, and

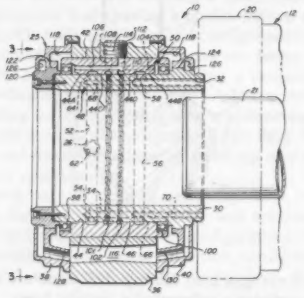
the sum of the velocities of all the pistons varies from point to point.

4,040,338

FLUID SUPPLY DISTRIBUTOR

John J. Wilson, Camden, and Donald M. Rhoades, Logansport, both of Ind., assignors to Logansport Machine Co., Inc., Logansport, Ind.

Filed June 14, 1976, Ser. No. 695,595
Int. Cl.[2] F01B *31/00*
U.S. Cl. 92—106 **16 Claims**



1. A fluid supply distributor for fluid communication between a stationary fluid source and a rotating hydraulic motor, said fluid supply distributor comprising:

a stationary housing including main port means;

shaft means adapted to be connected to the rotating hydraulic motor and including motor port means;

sleeve means in said housing interposed between said housing and said shaft means;

the exterior surface of said shaft means and the interior surface of said sleeve means defining sealing surfaces;

means mounting said shaft means for rotation within said sleeve means;

passage means intersecting said sealing surfaces and intercommunicating said main port means and said motor port means;

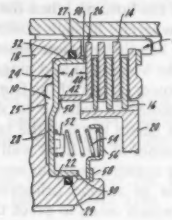
and release means for releasably retaining said sleeve means in a stationary position in said housing means and for permitting rotation of said sleeve means in response to seizure of said shaft means within said sleeve means.

4,040,339

AXIALLY ADJUSTABLE CLUTCH PISTONS

John Saxon Ivey, Bloomfield Hills, Mich., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Apr. 7, 1976, Ser. No. 674,343
Int. Cl.[2] F16J 1/10
U.S. Cl. 92—129 2 Claims



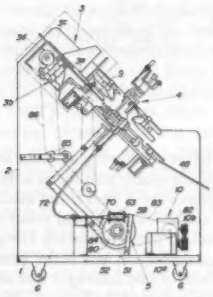
1. A piston assembly for use in a fluid actuator, wherein the assembly is mounted in a bore and moves in response to fluid pressure applied thereto, comprising a first annular sheet metal piston member having a portion thereof extending radially inward from an outer axially extending portion, a second annular piston member having a section thereof extending radially outward from an inner axially extending portion thereof, the respective axially extending portions of the other member when said assembly is subjected to fluid pressure whereby a relatively strong box-shaped construction is defined during operation of the piston and, the axially extending portions of said first and second piston members having ends thereof remote from the radially extending portions thereof and said ends have a series of scallops or serrations formed thereon wherein the length of the axially extending portions of said first and second piston members is controlled by a coining operation on said scalloped portions.

4,040,340

AUTOMATIC PASTE BOARD BOX FORMING MACHINE

Tomeo Iijima, 3-1363, Kamiaoki, Kawaguchi, Saitama, Japan

Filed June 9, 1976, Ser. No. 694,230
Claims priority, application Japan, June 9, 1975, 50-68628
Int. Cl.[2] B31B 3/26
U.S. Cl. 93—49 R 8 Claims



1. An automatic paste board box forming machine comprising a paste board box forming mechanism for bending and assembling a paste board, said paste board forming mechanism including a member for paste board box assembling, a paste board supplying mechanism for supplying paste boards to said forming mechanism and driving means for driving both mechanisms, wherein these mechanisms include:

a driving force generating mechanism for generating a driving force necessary for bending and assembling the paste board in said paste board box forming mechanism,

a hollow cable; a steel wire slidably inserted into said hollow cable, one end of said steel wire being connected to said driving force generating mechanism; the other end of said steel wire being connected to the paste board box assembling member, said paste board forming mechanism including an alarm;

a shock absorbing member interconnected between said one end of said steel wire and said driving force generating mechanism, said shock absorber being compressible to a predetermined length; and

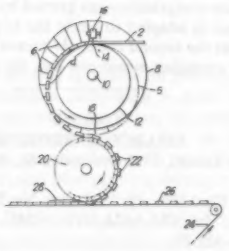
means detecting the compressed length of said shock absorbing member; for actuating said alarm upon said shock absorber being compressed to said predetermined length.

4,040,341

APPARATUS FOR MAKING COMPOSITE FILTERS

Desmond Walter Molins, London, and Norman Walter Jackson, Eastbourne, both of England, assignors to Molins Limited, England

Filed Nov. 5, 1975, Ser. No. 629,622
Claims priority, application United Kingdom, Nov. 8, 1974, 48399/74
Int. Cl.[2] A24C 5/50
U.S. Cl. 93—77 FT 12 Claims



1. Apparatus for producing composite filters comprising feed means for supplying a serial stream of contiguous first filter elements of predetermined length moving axially along a first path, means for moving said first filter elements received from said feed means transversely along arcuately spaced radial paths for axially separating said first filter elements, conveyor means for supporting a continuous wrapper web, means for feeding onto the web a stream of spaced second filter elements, means for transferring the axially separated first filter elements onto the wrapper web so that said first and second filler elements intercalate to form a stream of alternating filter elements, means for continuously wrapping the stream in the wrapper web to form a composite filter rod, and means for severing said rod at predetermined positions to produce composite filters or multiples thereof.

4,040,342

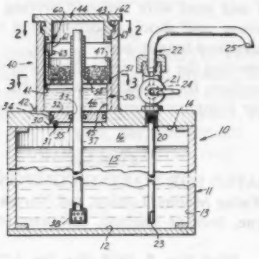
APPARATUS FOR GENERATION OF CARBON DIOXIDE GAS AND THE CARBONATION OF WATER

Robert Roy Austin, 2270 E. Orange Grove Blvd., Pasadena, Calif. 91104, and George Noblit Tyson, 4950 N. Live Oak Canyon Road, LaVerne, Calif. 91750

Filed Oct. 14, 1975, Ser. No. 622,141
Int. Cl.[2] A23F 1/00, 3/00; B01J 7/02
U.S. Cl. 99—323.1 34 Claims

1. Carbonating apparatus comprising: an absorber tank for holding liquid to be carbonated and for retaining the contents under pressure; an inlet port giving access to the inside of said absorber tank; a discharge tube exiting the absorber tank and having a flow passage from inside to outside of the absorber tank; a valve in said discharge tube selectively to permit or to

prevent flow of liquid therethrough; a generator chamber adapted to receive substances which, when mixed in aqueous solution, generate carbon dioxide; a removable closure giving access to the inside of said generator chamber; an injector conduit extending from a region in the generator chamber intended to contain gas into the absorber tank; first and second container means in said generator chamber for holding said substances; separator means for releasably holding the second



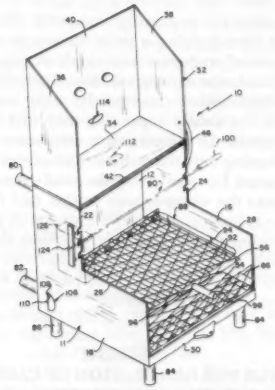
container means away from the first container means; actuator means for causing the substances in the two containers to be mixed; said separator means comprising a key and a groove, one of which is on the first container means and the other of which is on the second container means, and in which the actuator means comprises means carried by the closure, which actuator means is adapted to cause the key and groove to be aligned so that the second container means is enabled to move into the first container means and mix the substances.

4,040,343

CHARCOAL BROILER

Gerald B. De Lucchi, 2012 Greenwich St., San Francisco, Calif. 94123

Filed Dec. 30, 1974, Ser. No. 537,096
Int. Cl.² A47J *37/04*; F24C *1/16*
U.S. Cl. 99—421 H **5 Claims**



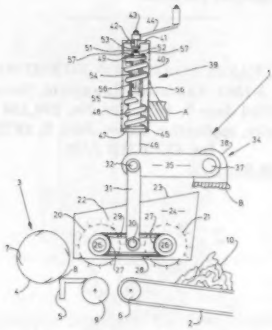
1. A charcoal broiler comprising the combination of a housing having a bottom floor, an open top, a pair of opposite side walls, a front wall having a lower corner, and a rear wall, all of said walls extending between the floor and the open top, a hood having a top wall, opposite side walls and a rear wall, hinge means for mounting a margin of the hood rear wall for pivotal movement about a transverse axis on an edge of the housing rear wall, said housing having a center of balance which is located within a vertical plane located between the front wall and rear wall of said housing, a handle mounted on the top wall of the hood, a perforate fuel-containing basket mounted within the housing, said basket extending in parallel relationship with the housing front wall, support means for supporting the broiler in a first orientation with the basket extending substantially vertical and in a second orientation with the basket extending substantially horizontal, said handle being positioned substantially on a mid-portion of the hood top wall and said axis of the hinge means being positioned substantially in a vertical plane which is horizontally offset from the center of balance of the hosuing when the housing is oriented in its first position whereby in such position a vertical lifting force applied to the handle by a user causes the hood to exert a vertical force on the housing at said hinge means to pivot the housing about said lower corner of the front wall which causes the plane of said center of balance to shift in a horizontal direction whereby it passes through the vertical plane encompassing the lower corner of the front wall for tilting the hosuing about said lower corner toward its second orientation, and with the housing in its second orientation a force applied against the handle which tends to pivot the hood away from the open top causes the hood to exert a force on the housing at said hinge means in a direction offset from said center of balance whereby the plane of said center of balance is shifted in a horizontal direction whereby it passes through the vertical plane encompassing the lower corner of the front wall for tilting the housing toward its first orientation.

4,040,344

FEED ROLLER MECHANISMS FOR FORAGE HARVESTERS

George Edgar Moore, and Alan Francis Morris, both of Ashburton, New Zealand, assignors to Dehye Harvesters Limited, Ashburton, New Zealand

Filed Nov. 25, 1975, Ser. No. 635,541
Claims priority, application New Zealand, Dec. 2, 1974, 176089
Int. Cl.² B30B *3/04*
U.S. Cl. 100—95 **9 Claims**



1. In a forage harvester having a frame, an inclined movable conveyor and cutting means positioned adjacent the upper end of the movable conveyor; a feed roller mechanism comprising a roller housing and at least one feed roller in said housing and having a longitudinal axis of rotation lying transverse to the movement of said conveyor, said roller housing being situated above the upper end of said conveyor and adjacent said cutting means, and being mounted within said harvester for limited vertical movement, an adjustable biasing means in the form of an elongate thruster arranged to allow the bias of said roller housing towards said conveyor to be adjusted, the elongate thruster being situated substantially centrally above said housing and mounted to the frame of the forage harvester, tie means linking said housing to said forage harvester to guide said limited vertical movement relative to said forage harvester substantially parallel to the longitudinal axis of the thruster, whereby forage material travelling up the conveyor and onto

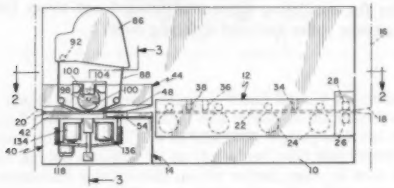
the cutting means will pass beneath said feed roller mechanism in a direction transverse to said longitudinal axis of rotation of said roller and be compressed by said roller, and said feed roller mechanism is prevented from rocking or tilting movement about an axis substantially transverse to the longitudinal axis of rotation of said roller such that the pressure applied by the roller is substantially uniform along its length, and said adjustable biasing means enables the bias on said feed roller mechanism to be varied and to be raised by said thruster to clear clogged material therefrom.

4,040,345

TICKET ADVANCE AND PRINTER MECHANISM

Ralph Delta Adams, Escondido, and Charles Junior Ingram, El Cajon, both of Calif., assignors to Cubic-Western Data, San Diego, Calif.

Filed Apr. 12, 1976, Ser. No. 675,946
Int. Cl.[2] B41J 1/44
U.S. Cl. 101—66 **2 Claims**



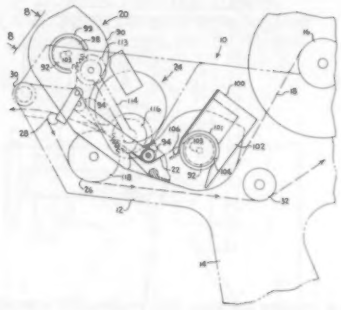
1. A ticket advance and printer mechanism, comprising:
an input stage having an entry portion for receiving a ticket;
a printer stage positioned to receive a ticket from said input stage;
said printer stage including an upper head unit and a lower platen unit having a flat ticket supporting platen;
said head unit having a guide flange parallel to and spaced from said platen and defining a ticket conducting channel therebetween;
stepper motor drive means on said printer stage for driving a ticket through said channel in sequential steps;
drive actuating means for selectively engaging and disengaging said drive means;
a rotatable print drum driven in sequential steps by said drive means, the print drum having a plurality of axially spaced character wheels, each with circumferentially spaced characters thereon;
said print drum having an axial shaft parallel to the platen and perpendicular to the path of the ticket through said channel, and being mounted in said head unit and protruding into said channel through said guide flange;
said drive means including a ticket engaging drive wheel on said shaft and fixed with the print drum;
said drive actuating means including an arm pivotally mounted on said platen unit, with a pinch roller rotataby mounted on one end of the arm, the platen having a slot through which said pinch roller protrudes opposite said drive wheel, and an actuator coupled to said arm for selectively moving said pinch roller into and out of driving engagement with said drive wheel;
a ticket engaging stop on said arm on the side of the pivot opposite said pinch roller, said stop protruding through said platen into the channel when the pinch roller is out of driving engagement with the drive wheel, and being retracted clear of the channel when the pinch roller is in the driving engagement position;
a plurality of print hammers mounted on the opposite side of the channel from the print drum, each hammer being aligned with one of said character wheels;
a printing ribbon extending between said print drum and hammers;
and hammer actuating means for actuating the hammers in a selected sequency while said drive means is disengaged.

4,040,346

LABEL PRINTING APPARATUS WITH TAPE CASSETTE

Alfreds Orlens, Old Greenwich, and David W. Hubbard, Stamford, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed Feb. 5, 1976, Ser. No. 655,479
Int. Cl.[2] B41J 1/48
U.S. Cl. 101—336 **5 Claims**



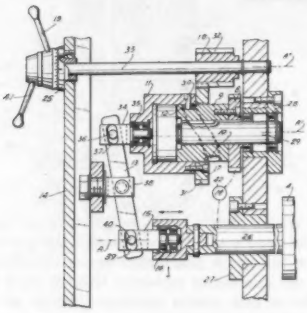
1. In a hand-held printing apparatus for printing a label with characters, said apparatus comprising a main frame and a printing member supported by the frame, said printing member having a series of character printing dies; an assembly for moving a ribbon-type printing medium in operative relation to the printing member; said label printing apparatus comprising:
A. a printing medium cartridge including
1. a cartridge housing having an open brige-like extension forming an opening for exposing a printing medium and for allowing the printing member to adaptably fit within said cartridge in order to contact said medium, said medium extending along said bridge-like extension in a mid-portion thereof, so that the printing members projects into said bridge-like extension to contact said medium disposed therein;
2. first spindle means mounted in said housing on which the medium may be wound;
3. second spindle means, also mounted in said housing, on which the medium may be wound, the medium being exposed when conducted between said first and second spindle means;
4. coupling means associated with at least one of said spindle means, said coupling means including a driven coupling gear accessible from the exterior of said housing;
B. mounting bracket means associated with the printing apparatus frame for embracing said cartridge housing to position the housing opening and the medium exposed therein in operative relation to the printing member; and
C. drive means connectible with said coupling means when said cartridge housing is embraced by said mounting bracket means for driving the spindle means with which said coupling means is associated to wind the medium thereon, said drive means comprising:
a. a first rotatably driven gear connected to one of said spindle means,
b. a second driven gear adapted to mesh with said coupling gear, and
c. belt means interconnecting said first and second driven gears.

4,040,347

INKING ARRANGEMENT FOR PRINTING MACHINE

Hans Johne, Radebeul; Arndt Jentzsch, Coswig; Gunter Schumann, Radebeul; Roland Reichenberger, Radebeul; Horst Kesselring, Radebeul, and Karl-Heinz Fischer, Coswig, all of Germany, assignors to Veb Polygraph Leipzig Kombinat Fur Polygraphische Maschinen Und Ausrustungen, Leipzig, Germany

Filed July 13, 1976, Ser. No. 704,916
Claims priority, application Germany, July 28, 1975, 187499
Int. Cl.[2] B41F *31/14*
U.S. Cl. 101—349 10 Claims



1. In a printing machine, the combination comprising:
a rubbing roller having a roller axis and axially displaceable therealong;
a cam rotatable about a cam axis generally parallel to said roller axis and formed with a continuous circumferential radially open cam groove crossing a plane perpendicular to said cam axis;
a cam follower nonrotatable about said cam axis but displaceable parallel thereto and engaged axially nondisplaceably in said groove;
cam and roller drive means for synchronously rotating said cam and roller respectively about said cam and roller axes and thereby reciprocating said follower parallel to said cam axis;
coupling means connected between said follower and said rubbing roller for displacing same along said roller axis in synchronism with the displacement of said follower parallel to said cam axis; and
means for angularly displacing said follower about said cam axis and for locking it in any of a plurality of angularly offset positions therearound.

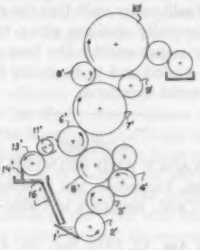
4,040,348

DUCTOR OR FILM-TRANSFERRING INKING MECHANISM, PARTICULARLY FOR OFFSET PRESSES

Peter Gertsch, Bern, and Alfons Wehrli, Liebefeld, both of Switzerland, assignors to Maschinenfabrik Wifag, Switzerland

Filed Apr. 8, 1976, Ser. No. 675,061
Claims priority, application Switzerland, May 5, 1975, 5713/75
Int. Cl.[2] B41L *27/16, 27/22*
U.S. Cl. 101—350 2 Claims

1. In a ductor or film-transferring inking mechanism for printing machines which include a plate cylinder having a printing form, an ink reservoir, a ductor roller mounted for rotation so as to dip into the ink of said ink reservoir, and at least one additional rotatable roller engageable during printing between the surfaces of said ductor roller and said plate cylinder, the improvement comprising a rotatable stripper roller, a stripper engaged with the surface of said stripper roller to strip ink therefrom as said stripper roller is rotated, ink return means located in a position to receive the stripped ink from said stripper roller, a rotatable take-off roller associated with one of said additional rollers of the inking mechanism and adapted to engage said one of said additional rollers to take up the periodically unused, no longer applicable ink from said additional



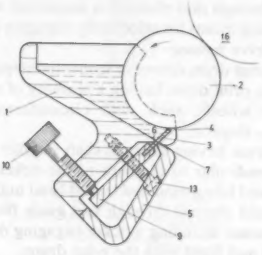
roller and is also engageable with said stripper roller to transfer the ink to the stripping roller, and means mounting said takeoff roller for oscillating movement toward and away from said distributor roller and said stripping roller.

4,040,349

INK FOUNTAIN ASSEMBLY FOR PRINTING PRESSES

Willi Jeschke, Heidelberg, Germany, assignor to Heidelberger Druckmaschinen Aktiengesellschaft, Heidelberg, Germany

Filed Dec. 19, 1975, Ser. No. 642,485
Claims priority, application Germany, Dec. 19, 1974, 2460116
Int. Cl.[2] B41F *31/02*
U.S. Cl. 101—365 10 Claims

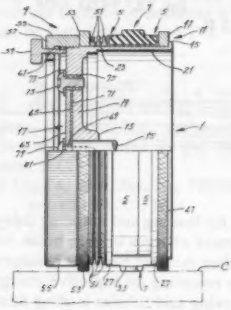


1. Ink fountain assembly for a printing press comprising an ink fountain, a fountain roller engageable in said ink fountain for transferring ink therefrom to a printing unit of a printing press, an elongated ink knife having a scraper edge on one side and having another side opposite and extending along the length of said scraper edge, said scraper edge being engageable with the peripheral surface of the fountain roller for scraping ink therefrom, said ink knife being divided into individual zones mutually spaced from one another along the length of said ink knife to allow the engagement of the scraper edge with the roller to be selectively adjusted by individual zones; means for holding said ink knife along a portion between said scraper edge and said opposite side in a fixed position relative to said roller; and means operatively engageable with said opposite side of said ink knife for adjusting the position of said scraper edge relative to said fountain roller zonewise.

4,040,350
ROTARY PRINTER

Roger A. Hopkins, Herrin, Ill., assignor to Diagraph-Bradley Industries, Inc., Herrin, Ill.

Filed July 1, 1976, Ser. No. 701,584
Int. Cl.[2] B41F *13/10*
U.S. Cl. 101—376 10 Claims

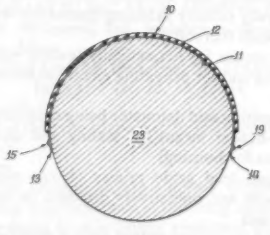


1. A rotary printer comprising a wheel having a generally cylindrical surface, type-holding ring means on the wheel, said ring means comprising a pair of relatively thin cylindrical ring members having a sliding fit on the wheel, said ring members being positioned side-by-side on the wheel, each of said ring members having a radially outwardly extending flange at the side thereof away from the other ring member, each of said flanges having a lip at its outer edge extending inwardly toward the other flange spaced radially outwardly from the respective ring member, said lips defining inwardly directed opposed annular grooves at opposite sides of the ring members, a series of type members on said ring members, each type member comprising a block of elastomeric material having an inside face engageable with the outside faces of said ring members and extending across said ring members with the ends of the block received in said grooves, with a raised type face extending outwardly from the block between said lips, abutment means extending radially outwardly from the wheel axially engageable by the flange of one of said ring members, and means on the wheel for clamping said ring members with the type members therebetween against said abutment means thereby to lock said ring members to the wheel and said type members to said ring members.

4,040,351
MAGNETICALLY HELD PRINTING MAT

Hans B. Faust, Mount Prospect, Ill., assignor to Weber Marking Systems, Inc., Arlington Heights, Ill.

Filed Oct. 12, 1976, Ser. No. 731,848
Int. Cl.[2] B41F *27/02*
U.S. Cl. 101—382 MV 3 Claims

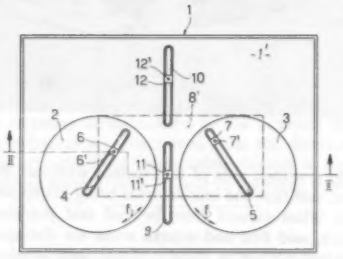


1. In a printing device of the type employing a magnetic cylinder comprising a generally rectangularly shaped flexographic printing mat of a flat plane sheet steel adapted to be wrapped around said cylinder and gripped thereto by the magnetic attraction of the cylinder, and the leading and trailing ends only of said flexographic printing mat being preformed with an inverted V-shape lying parallel to and closely adjacent each end thereof and leaving an intermediate flat portion on the mat whereby the resultant spaced apart parallel engagement lines at the ends of the flexographic printing mat created by the inverted V-shapes cause a more concentrated magnetic adherence of the ends of the mat to the magnetic cylinder over the intermediate flat portion of the mat thereby preventing unwarranted separation of the mat from the cylinder.

4,040,352
ADJUSTABLE WORK TABLE FOR SILK SCREEN PRINTER

Ezio Curti, Viale Regina Giovanna 38, Milan, Italy

Filed Jan. 30, 1976, Ser. No. 653,615
Int. Cl.[2] B41F *15/26, 17/00*
U.S. Cl. 101—407 BP 8 Claims



1. A printing table for use with work having positioning openings in the under portion thereof comprising a flat table-forming body, means provided on said table body for stabilizing said work against accidental shifting during the printing process comprising said body having at least one aperture therein, a complementarily formed disc disposed in said at least one aperture for rotation about an axis perpendicular to the plane of said table-forming body, said disc having a top surface coplanar with said body, said disc having an upwardly opening groove, a carriage slideably disposed in said groove for adjustable movement reciprocally longitudinally thereof, a reference pin carried on said carriage and projecting upwardly of the plane of the top surface of said disc and said body for engagement within at least one of said openings in said printing work, and means for locking said carrigage in selected adjusted position within said groove.

4,040,353
PROCESS FOR COLORING SURFACES

Michel Serge Lefebvre, Guise, France, assignor to OPI Metriservice, Societe Anonyme, France

Filed Oct. 28, 1975, Ser. No. 626,317
Claims priority, application France, Oct. 31, 1974, 74.36399
Int. Cl.[2] B41M *5/14;* G09F *19/14*
U.S. Cl. 101—426 5 Claims

1. A process for preparing a coloured surface having different visual impressions depending upon the distance from which it is viewed, said process comprising the steps of:

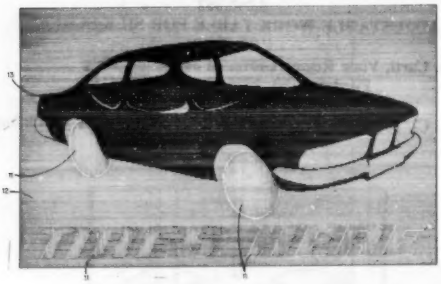
colouring a first area of said surface by at least two colours in the following manner:

distributing distinct first unitary zones of a first color substantially uniformly over predetermined portions of said first area of said surface;

distributing distinct second unitary zones of a second colour substantially uniformly over predetermined portions of said first area of said surface, whereby the sum of the surface areas covered by said unitary zones of

said first colour bears a predetermined ratio relationship with respect to the sum of the surface areas covered by said unitary zones of said second colour, said unitary zones of each of said at least two colours being of such size that they are not visually distinguishable when viewed from beyond a predetermined distance at which said surface is clearly visible;

determining the resultant colour of said at least two colours in said first area, said resultant colour being the optical mixtures of said at least two colours in the ratio of surface areas covered by each colour in said first area; and



colouring a second area of said surface with said resultant colour, said first and second areas being juxtaposed;

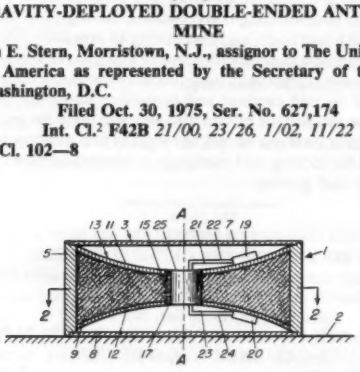
whereby when viewed from beyond said predetermined distance, said first and second areas are distinguishable while said surface is clearly visible, and when viewed from a point located at a distance equal to or less than said predetermined distance, said first area is perceived as having juxtaposed zones of said at least two colours and said second area is perceived as having said resultant colour.

4,040,354

GRAVITY-DEPLOYED DOUBLE-ENDED ANTI-TANK MINE

Allen E. Stern, Morristown, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 30, 1975, Ser. No. 627,174
Int. Cl.[2] F42B *21/00, 23/26, 1/02, 11/22*
U.S. Cl. 102—8 **7 Claims**



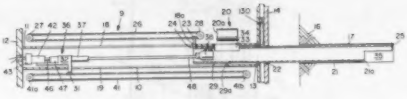
1. A high-explosive, anti-tank land mine comprising a hollow external connecting wall, two opposite, substantially-flat, circular, end walls attached to the ends of said hollow external connecting wall, said mine being adapted to be deployed from the air and come to rest by gravity on either end wall thereof; a charge of high explosive material fixed within said hollow external connecting wall, said charge having two concave end surfaces facing said end walls, each surface lined with a concave hardened metal plate thereby forming two oppositely directed double-ended plates; and fuze means disposed within said hollow external connecting wall for initiating said charge after said mine has come to rest on one of said end walls, to explosively project the upper metal plate.

4,040,355

EXCAVATION APPARATUS AND METHOD

Robert B. Hopler, Jr., Succasunna, N.J., assignor to Hercules Incorporated, Wilmington, Del.

Filed Oct. 9, 1975, Ser. No. 621,200
Int. Cl.[2] F42D *3/04*
U.S. Cl. 102—22 R **18 Claims**



4. Apparatus for loading and initiating delay type percussion initiatable explosive charges in bore holes, which comprises:

a tubular loading member having a passageway in a side wall thereof for receiving an explosive charge;

means for moving said tubular loading member into and out of a bore hole;

means for advancing said charge within said tubular loading member into emplacement within said bore hole;

means mounted to said advancing means for impacting said emplaced charge to initiate said charge; and

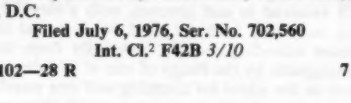
means responsive to actuation of said impacting means for actuating said moving means to retract said tubular loading member and said advancing means from said bore hole during the delay period of said initiated charge.

4,040,356

CONVERGING WAVE DETONATOR

Wallace E. Voreck, Jr., Sparta, and Everett W. Dalrymple, Randolph, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed July 6, 1976, Ser. No. 702,560
Int. Cl.[2] F42B *3/10*
U.S. Cl. 102—28 R **7 Claims**



1. A converging wave detonator which comprises:

means for housing said detonator therein and for reflecting an outwardly radially radiating detonation wave from the interior walls thereof;

lead-header means for hermetically sealing with said means for housing and for providing electrical connection therethrough;

means for igniting said detonator being centrally disposed on said lead-header means for sealing and enclosed within said means for housing;

a disc shaped lead azide primer charge member axially aligned with and operatively disposed on said means for igniting; and

a disc shaped secondary output charge member operatively disposed on said primer charge member;

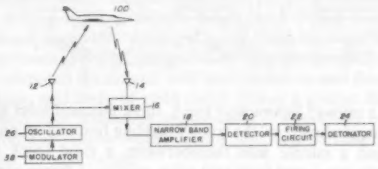
wherein, in initial detonation wave, centrally produced in said lead azide primer charge by said means for igniting,

propagates radially outward from said lead azide primer charge until said detonation wave hits the interior walls of said means for housing generating a reflected shock wave which causes pressure within said means for housing to increase to a level which in turn causes annular initiation at the outer edges of said secondary output charge and the generation of a converging detonation wave in said secondary output charge which after colliding in the center of said secondary output charge produces an axial jet of explosion materials capable of initiating a high explosive acceptor made of material such as RDX.

4,040,357
AIR TARGET FUZE

William K. Saunders, Bethesda, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 4, 1959, Ser. No. 797,310
Int. Cl.² F42C *13/04*
U.S. Cl. 102—70.2 P **3 Claims**



1. An improved air target fuze for use on a missile, said fuze comprising in combination: an oscillator, a modulator connected to frequency modulate said oscillator with a modulating waveform chosen so that the carrier frequency of said oscillator is changed from its initial value at approximately a $t^{2/3}$ rate, where t represents time, until a predetermined frequency is reached, the wave then decreasing at a $-t^{2/3}$ rate until the carrier frequency returns to its initial value, the above cycle the repeating periodically, a sidewise looking transmitting antenna to which the frequency modulated output of said oscillator is fed, a sidewise looking receiving antenna for receiving a reflected wave from a target, a mixer to which the received wave and a portion of the transmitted wave are fed, a narrow band amplifier having a center frequency f_o to which the output of said mixer is fed, said modulating waveform further being chosen so that at the fuze-to-target cut-off distance beyond which the fuze is not to respond the difference frequency between the transmitted and received waves when the transmitted wave has a frequency corresponding to said predetermined point is substantially equal to the center frequency f_o of said amplifier, a detonator, and means connected to the output of said narrow band amplifier for functioning said detonator in response to the receipt of a signal from said amplifier.

4,040,358
HYDRAULIC DELAYED ARMING FUZE

George Webb, Richmond, Ind., assignor to Avco Corporation, Wilmington, Mass.

Filed Dec. 14, 1965, Ser. No. 513,804
Int. Cl.² F42C *15/22, 15/34*
U.S. Cl. 102—79 **7 Claims**

1. In a fuze of the type adapted to be installed in a missile, the combination of:

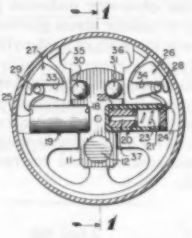
firing means,

a displaceable element having a normal disabling positional relationship with reference to the firing means but adapted to be displaced to an enabling positional relationship,

said displaceable element being formed with locking surfaces,

a plurality of locking means each comprising a partially fluid-filled hollow cylinder, a hydraulic piston, formed with a timing orifice and slidably mounted within the cylinder, and a spring for biasing the piston radially inwardly,

and a plurality of retainer weights for yieldably holding the cylinders in locking position and in engagement with said surfaces, said retainer weights being pivotally mounted and proportioned to exert increased retaining force on the cylinders as centrifugal force increases,

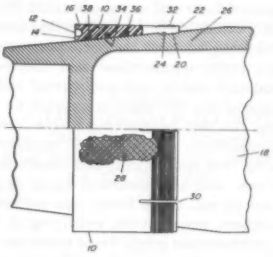


centrifugal force due to spin of the missile in flight moving the pistons radially outwardly against the force of the fluid until the thrust exerted by the cylinders overcomes the retaining thrust exerted by the retainers whereupon the cylinders are disengaged from the displaceable element to permit the displaceable element to move to its enabling position with respect to the firing means.

4,040,359
DISCARDING FRANGIBLE ROTATING BAND

Raymond S. Blajda, Parsippany; Robert W. Kantenwein, Landing; Gerald E. Gaughan, Dover, all of N.J., and John F. Sikra, Feasterville, Pa., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 14, 1976, Ser. No. 686,610
Int. Cl.² F42B *13/16*
U.S. Cl. 102—93 **4 Claims**



1. A discarding frangible rotating band for use on a spin launched projectile from a rifled gun which comprises:

a projectile having a boattail end with an annular, circumferentially disposed, knurled surface thereon, an annular projectile retaining groove positioned circumjacent the periphery of said boattail end and adjacent to said knurled surface;

composite rotating band means, press fit on said knurled surface and into said annular projectile retaining groove, for maintaining structural integrity when subjected to compressive forces of launch in order to provide an obturating seal to forcibly expel said projectile from said gun, for transmitting spin forces imparted by said rifled gun to said projectile, and for fragmentizing when exposed to tensile shear conditions as soon as said band means exits from the muzzle of said gun, which includes:

a cylindrically shaped band member being made of a

mixture of an acetal copolymer resin and hollow glass beads, said band member having a front end which has an inwardly protruding retaining lip on the interior wall of said cylindrically shaped band member, a plurality of peripherally concentrically disposed band grooves located in the outer wall, a plurality of peripherally concentrically disposed band grooves located in the outer wall, a plurality of equally spaced longitudinal band slots disposed through said front end, a rear end having an annular obturator undercut groove therein, and a plurality of annular stress grooves rearwardly disposed in the interior wall of said cylindrically shaped band member; and

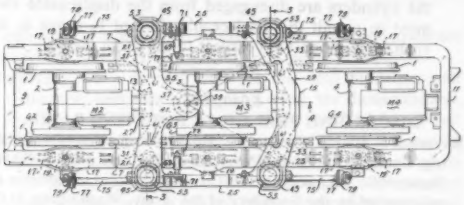
epoxy resin means for filling said stress grooves to enable said rotating band to maintain structural shape while being exposed to compressive forces in said gun during launch and for helping said rotating band to fragmentize when said rotating band emerges from the muzzle of said gun.

4,040,360

RAILWAY LOCOMOTIVE TRUCK

Keith L. Jackson, Granite City, Ill., assignor to General Steel Industries, Inc., St. Louis, Mo.

Filed Feb. 17, 1976, Ser. No. 658,341
Int. Cl.[2] B61C *3/00*; B61F *3/06, 5/14, 5/16*
U.S. Cl. 105—136 **5 Claims**



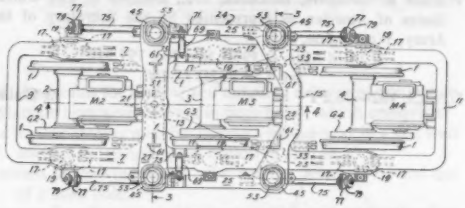
1. In a railway locomotive truck, three wheeled axles spaced apart longitudinally of the truck including first and second end axles and a middle axle therebetween, a rigid truck frame resiliently supported from said axles, said truck frame comprising longitudinally extending side members and first and second transversely extending transom members connecting said side members, respectively, intermediate said first end and said middle axles and said middle and said second end axles, traction motors respectively drivingly connected to each of said axles and having reaction connections to the frame, a bolster comprising longitudinally extending side members and transversely extending first and second end members connecting said side members, said side members being disposed transversely outboard of said truck frame side members and said bolster end members, respectively, overlying at least in part the respective intermediate truck frame transoms, said bolster and said truck frame being substantially free of structural elements in the region defined by said bolster end members and said truck frame side members whereby said bolster end members and the portions of said frame side members therebetween define an opening substantially commensurate with the space defined by said intermediate transom members and said frame side members, opposed horizontal bearing means on both of said bolster end members and said truck frame, said first intermediate truck frame transom and said first bolster end member having cooperating vertical axis swivel bearings centered transversely of the truck, said opposed bearings comprising pairs of transversely spaced upwardly and downwardly facing bearing surfaces on said frame side members and both of said bolster end members, a pair of upright body-support springs seated on each of said bolster end members in substantial transverse alignment with the respective pairs of opposed bearings whereby each of said bolster end members constitutes a beam loaded adjacent its ends and supported near its ends on said truck frame side members, and said bolster side members constitute vertically unloaded spacers and ties between said bolster end members, and a pair of longitudinally upwardly and outwardly inclined links connected at their lower ends to said bolster side members and arranged for connection to the locomotive body such that their axial projections intersect at track level.

4,040,361

RAILWAY LOCOMOTIVE TRUCK

Keith L. Jackson, Granite City, Ill., assignor to General Steel Industries, Inc., St. Louis, Mo.

Filed May 6, 1976, Ser. No. 683,923
Int. Cl.[2] B61F *3/06, 5/06, 5/16, 5/24*
U.S. Cl. 105—136 **6 Claims**

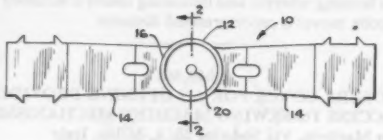


1. In a railway locomotive truck, three wheeled axles spaced apart longitudinally of the truck including first and second end axles and a middle axle therebetween, a rigid truck frame resiliently supported from said axles, said truck frame comprising longitudinally extending side members and first and second transversely extending transom members connecting said side members, respectively, intermediate said first end and said middle and said second end axles, traction motors respectively drivingly connected to each of said axles and having reaction connections to the frame, a bolster comprising longitudinally extending side members and transversely extending first and second end members connecting said side members, said side members being disposed transversely outboard of said truck frame side members and said bolster end members, respectively, overlying at least in part the respective intermediate truck frame transoms, said bolster and said truck frame being substantially free of structural elements in the region defined by said bolster end members and said truck frame side members, whereby said bolster end members and the portions of said frame side members provide an opening substantially commensurate with the space defined by said intermediate transom members and said frame side members, said first intermediate truck frame transom and said first bolster end member having co-operating vertical axis swivel bearings at their centers in vertical load supporting relation with each other and the truck frame and said second bolster end member having transversely spaced opposed horizontal sliding bearings in vertical load supporting relation with each other for providing a stable three-point support of said bolster on said truck frame, upright springs carried on the end portions of said bolster end members for supporting a locomotive body on the truck, and a pair of longitudinally upwardly and outwardly inclined links connected at their lower ends to said bolster side members and arranged for connection at their upper ends to the locomotive body, such that their axial projections intersect substantially at rail level whereby to transmit tractive forces from the truck to the locomotive body substantially at rail level, the upright springs on said first bolster end member being in substantial alignment transversely of the truck with the vertical axis of said swivel bearing and the upright springs on said other bolster end member being in substantial alignment transversely of the truck with said sliding bearings, whereby each of said bolster end members constitutes a beam loaded adjacent its ends and supported intermediate its ends on said truck frame, and said bolster side members constitute vertically unloaded spacers and ties between said bolster end members.

4,040,362
RAILWAY BOLSTER INTEGRAL WEAR LINER

Carl Emil Oppenheim, West Dundee, Ill., and James McKenna, Atlanta, Ga., assignors to Chemetron Corporation, Chicago, Ill.

Continuation of Ser. No. 517,680, Oct. 24, 1974, abandoned, which is a division of Ser. No. 406,678, Oct. 15, 1973, Pat. No. 3,894,676. This application Sept. 29, 1976, Ser. No. 727,778
Int. Cl.[2] B61F *5/16;* C22C *39/20, 39/26;* F16C *17/10*
U.S. Cl. 105—226 5 Claims

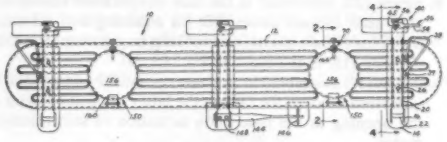


1. A railway car bolster including an upwardly opening bolster bowl comprising an upstanding flange, a wearable steel liner having top and bottom edges within said flange and defining a generally cylindrical metal receiving void between said upstanding flange and said liner, and a body of alloy weld metal disposed within said void and bonded to said flange and said liner, said body of weld metal having a greater hardness than said liner, extending substantially continuously between said top and bottom edges of said liner and forming a wear element for said flange.

4,040,363
COMBINATION HATCH COVERS

Howard J. Walk, and Dallas W. Rollins, both of St. Charles, Mo., assignors to ACF Industries, Incorporated, New York, N.Y.

Continuation of Ser. No. 365,533, May 31, 1973, abandoned. This application June 8, 1976, Ser. No. 694,000
Int. Cl.[2] B61D *39/00*
U.S. Cl. 105—377 31 Claims

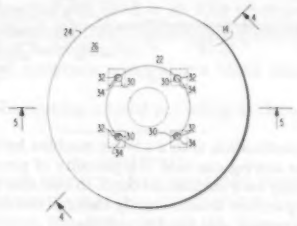


1. A combination hatch cover for railway car roofs comprising:
an elongated hatch cover made from a material selected from the group consisting of metallic and non-metallic material, having its longitudinal axis adapted to extend along the longitudinal axis of the railway car and adapted to close a longitudinally extending opening in the car roof;
at least one strap pivotally mounting said elongated cover for transverse movement between open and closed positions with respect to the opening in the roof;
said strap adapted to engage elongated cover latch means mounted upon said car for holding said elongated cover in closed position;
at least one opening provided in said elongated cover;
means pivotally mounting a small hatch cover on said elongated cover;
said small cover adapted to move between open and closed positions with respect to said opening in said elongated cover;
said small cover having a locking portion affixed thereto;
small cover latch means mounted upon said elongated cover comprising an overcenter locking lever including a locking handle and a locking ring and wherein said locking ring engages said locking portion adapted to hold said smaller cover in closed position;
said small cover latch means being operable independently of said elongated cover latch means whereby said small cover may be opened and closed while said elongated cover is in closed position and whereby said elongated cover may be moved between open and closed positions with said small cover remaining closed during such movement.

4,040,364
TABLE APPARATUS INCLUDING A LOCKABLE, ROTATABLE TRAY

A. Perry Morgan, Jr., Constitution Hill, Princeton, N.J. 08540

Filed Mar. 29, 1976, Ser. No. 671,207
Int. Cl.[2] A47B *11/00*
U.S. Cl. 108—28 11 Claims

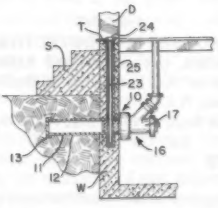


1. A table apparatus comprising:
a table top having a depression therein, said depression having a periphery including a plurality of cut-out sections located there-around;
a base support means for supporting said table top;
a rotatable tray means fitted in said depression, said rotatable tray means having a periphery including a plurality of cut-out sections there-around at least some of which line up across from corresponding cut-out sections in the periphery of said depression to form locking apertures therewith; and,
locking means fitted in said locking apertures for selectively locking said rotatable tray means relative to said table top.

4,040,365
UTILITY SYSTEM WALL SAFE

Robert F. Baxter, 2944 Lincoln St., Highland, Ind. 46322

Filed July 31, 1975, Ser. No. 600,647
Int. Cl.[2] E05G *1/04*
U.S. Cl. 109—50 1 Claim



1. A wall safe comprising a vault pipe section in a wall, removable closure means simulating a utility system section extending from one face of the wall, said closure means including a plug removably inserted in the vault pipe section, gasket means provided at the face of said wall for providing a seal, an eccentrically tapered locking pin disposed in and passing through said vault pipe section and said plug thereby to compress said gasket and maintain a seal at the face when said

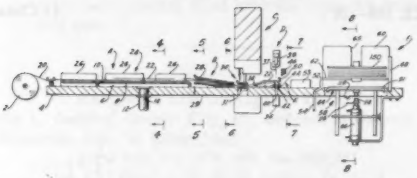
locking pin is in a locked position, said locking pin being of a length so as to be accessible for removal and insertion from and into said plug at an opening in said wall remote from said vault pipe section, said locking pin including a removable head pin for rotating said locking pin to release said gasket means out of sealing relationship with said wall.

4,040,366

AUTOMATIC HEMMING APPARATUS

Seymour Silverman, New York; Paul F. Costa, Flushing, and Charles Block, North Bellmore, all of N.Y., assignors to Silverman Machines, Inc., New York, N.Y.

Filed Apr. 16, 1975, Ser. No. 568,561
Int. Cl.[2] D05B *33/02*
U.S. Cl. 112—121.29 **40 Claims**



1. In combination with a sewing machine having a stitching means for sewing one side of a plurality of pieces of material, each resting on a continuous band, to one side of said band as it is being moved from a supply through the stitching means, and then cutting said band into strips:

a. a support adapted to be positioned between said supply and said stitching means;

b. an elongated member adapted to support said band, said member being attached to said support and extending for at least a portion of the distance between said supply and said stitching means;

c. means for retaining said pieces of material in position on said band;

d. folder means for folding said one side of said pieces under said one side of said band, said folder means located upstream of and adjacent to the said stitching means;

e. separation means located downstream of said stitching means for vertically separating each of said pieces from said band at an unstitched portion of the pieces, respectively;

f. a cutting means located downstream of said separation means for cutting said band across its transverse axis into said strips when actuated; and

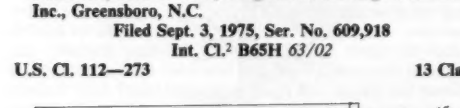
g. sensing means located between said cutting means and said separation means for sensing the passage of an end of each of said pieces which is vertically separated from said band and actuating said cutter in response thereto.

4,040,367

BOBBIN LOW DETECTOR

William B. Crawford, Greensboro, and Anthony T. Solomon, Reidsville, both of N.C., assignors to Burlington Industries, Inc., Greensboro, N.C.

Filed Sept. 3, 1975, Ser. No. 609,918
Int. Cl.[2] B65H *63/02*
U.S. Cl. 112—273 **13 Claims**



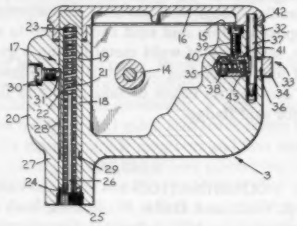
1. A bobbin thread low detector for use in a sewing machine which includes a bobbin spool having a central hub, said bobbin spool being mounted in a bobbin housing in which an opening has been provided, said detector comprising a probe slidably mounted within a probe housing, said probe housing being mounted on the sewing machine such that the probe is aligned with the opening in said bobbin housing, means for moving said probe within said probe housing into and out of said bobbin housing when said sewing machine is not operating, said moving means being mounted to said sewing machine and indicating means actuated by said probe for indicating the condition of said bobbin, said moving means includes adjusting means for adjusting the distance said probe is moved into said bobbin housing wherein said indicating means is actuated when said probe moves a predetermined distance.

4,040,368

CLOSURE COVER FOR AN OPENING PROVIDING ACCESS TO SEWING MACHINE MECHANISMS

Nerino Marforio, Via Soderini 35/A, Milan, Italy

Filed Aug. 20, 1976, Ser. No. 716,134
Claims priority, application Italy, Sept. 17, 1975, 22301/75
Int. Cl.[2] D05B *75/00*
U.S. Cl. 112—258 **5 Claims**



1. A device for selectively opening and closing the opening providing access to the thread control members for the lower hook in sewing machines of the type having cylindrical and U-shaped bases, said device comprising:

a. a closure cover **(16)** attached to the sewing machine base;

b. means **(33)** assembled in the base in operative association with such closure cover **(16)** for retaining and releasing the latter from a position of locking engagement with the opening **(15)** in the base; and

c. means **(17)** assembled in the base operatively connected to said closure cover for raising the latter to position clear of the opening in the base upon actuation of said releasing means.

4,040,369

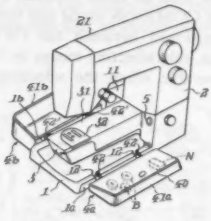
CONVERTIBLE-BED TYPE SEWING MACHINE HEAD

Yukio Kaito, Yamagata, Japan, assignor to Happy Sewing Machine Manufacturing Company, Yamagata, Japan

Filed Sept. 27, 1976, Ser. No. 726,817
Claims priority, application Japan, Nov. 17, 1975, 50-137252
Int. Cl.[2] D05B *75/00*
U.S. Cl. 112—258 **1 Claim**

1. A convertible-bed type sewing machine head comprising: a base plate; a vertical column upstanding from one end portion of said base plate; an elongate tubular bed extending substantially horizontally from a lower portion of said vertical column in overhanging relation to said base plate; a front auxiliary bed including a substantially rectangular hollow box-like body opening on one side thereof and pivotally secured to said base plate along the front edge thereof, by means of a pair of supporting legs formed on said box-like body, for swinging movement to and from an upright position in which the open side of said box-like body faces said tubular bed, said box-like body, as swung into said upright position, having a wide planar top portion formed to define a front auxiliary work-supporting table surface in substantially the same plane

as the top surface of said tubular bed, a narrow bottom portion provided with said pair of supporting legs and a pair of substantially sector-shaped opposite end walls diverging upwardly from said bottom portion to said top portion; and a rear auxiliary bed including a substantially rectangular hollow box-like body opening on one side thereof and pivotally secured to said base plate along the rear edge thereof, by means of a pair of supporting legs formed on the second-mentioned box-like body, for swing movement to and from an upright position in which the open side of the box-like body faces said tubular bed, said box-like body of said rear auxiliary bed, as



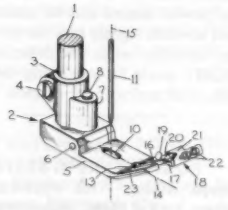
swung into said upright position, having a wide planar top portion formed to define a rear auxiliary work-supporting table surface in substantially the same plane as the top surface of said tubular bed, a narrow bottom portion provided with said pair of supporting legs, and a pair of substantially sector-shaped opposite end walls diverging upwardly from said bottom portion to said top portion: both said front and rear auxiliary beds further including a cover plate fitted to the open side of said box-like body to afford access to the interior thereof, and partitions and holding means, arranged in said box-like body to enable the latter to be used as a case for storing accessories and other articles.

4,040,370

STITCH CONTROL DEVICE FOR SEWING MACHINES

Nerino Marforio, Milan, Italy, assignor to Rockwell-Rimoldi S.p.A., Milan, Italy

Filed Sept. 29, 1976, Ser. No. 727,886
Claims priority, application Italy, Oct. 2, 1975, 27872/75
Int. Cl.[2] D05B *65/00, 53/00*
U.S. Cl. 112—299 **7 Claims**



1. A chain stitch control device for straight sewing machines of the type having a sewing needle disposed in operative association with a needle aperture provided in the machine presser foot, said chain stitch control device comprising:

a. a sole (5) forming the lower portion of the presser foot;

b. means on one end of said sole for receiving a chain of stitches extending between the needle and a sewn workpiece;

c. means interconnecting the needle aperture and said receiving means for aligning the chain of stitches received by the latter with the axis of the sewing needle;

d. gripping means attached to said sole for temporarily holding the chain of stitches received by said receiving means; and

e. a cutting means fixed on said sole for severing the chain of stitches intermediate the gripping means a sewn workpiece to permit the sewing instrumentalities to incorporate the chain of stitches extending from the sewing needle into the seam formed in the next workpiece.

4,040,371

POLYSILOXANE COATED POLYESTER FIBERS BLENDED WITH OTHER FIBERS TO OBTAIN FIBROUS MASS HAVING MORE ACCEPTABLE FLAME RESISTANCE THAN A MASS OF UNBLENDED POLYSILOXANE COATED FIBERS

John LaMonte Cooper, West Grove, Pa., and James Alvis Newnam, Hockessin, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 29, 1976, Ser. No. 671,278
Int. Cl.[2] A47G *9/02, 9/08;* **B32B** *7/08, 27/02;* **D04H** *1/00*
U.S. Cl. 112—420 **9 Claims**

1. An intimate blend of staple fibers comprising by weight about 80 to 98% of polyester staple fibers having a cured polysiloxane coating and about 2 to 20% of organic staple fibers that maintain their physical integrity when exposed to the flame from a burning match.

8. A quilted composite comprising a blend according to claim **1.**

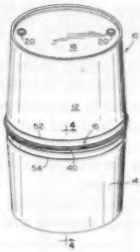
9. A fabric comprising a blend according to claim **1.**

4,040,372

METHOD FOR DETACHABLY SEALING TOGETHER THE SECTIONS OF A BARREL CONTAINER ASSEMBLY

Robert D. Flanders, Rte. 2, Box 666, No. 42, Wilsonville, Oreg. 97070

Division of Ser. No. 614,863, Sept. 19, 1975, Pat. No. 3,981,409, which is a continuation of Ser. No. 255,597, May 22, 1972, Pat. No. 3,940,008. This application Apr. 12, 1976, Ser. No. 675,940
Int. Cl.[2] B21D *51/20*
U.S. Cl. 113—120 L **3 Claims**



1. A method for detachably joining a pair of barrel half sections together to form a leak-proof barrel assembly for storing and shipment of fluids and other materials, said barrel sections having a pair of projecting flanges extending peripherally around the open ends of said barrel sections and having a respective pair of oppositely facing lips formed peripherally around the edges thereof, said method comprising:

a. inserting a resilient gasket member between said flange pair as a pair of said barrel sections are positioned with their respective open ends opposed to each other and separated by the thickness of said gasket member;

b. pressing said opposed barrel sections together to compress said interposed gasket member between said flange pair utilizing mechanical press means for applying compressive force to said barrel sections;

c. while said pressure is maintained, inserting a plurality of C-shaped clamp members over said flange pair at spaced locations around the periphery thereof, said clamp members having their respective ends bent inwardly toward each other so as to mate with a portion of said oppositely facing lips when inserted on said flanged pair,

d. releasing said pressure applied to said opposed barrel sections by said press means, whereby said gasket member expansively urges said barrel sections apart, such that said outermost extremities of said oppositely facing lips are moved to bear respectively against the mating inner surfaces of said plurality of clamp members thereby locking said flange pair against respective ends of said C-shaped clamp members.

4,040,373

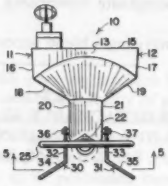
STEERING AND STABILIZATION APPARATUS FOR WATERCRAFT

Allen Jones, Jr., 5028 Lauderdale Ave., Virginia Beach, Va. 23455

Continuation-in-part of Ser. No. 579,896, May 22, 1975, abandoned, which is a continuation-in-part of Ser. No. 566,353, April 9, 1975, Pat. No. 3,995,575, which is a continuation-in-part of Ser. No. 279,714, Aug. 10, 1972, Pat. No. 3,881,438. This application Feb. 26, 1976, Ser. No. 661,626

Int. Cl.[2] B63B *39/06*

U.S. Cl. 114—126 **13 Claims**



1. A watercraft, comprising;
a. an elongated hull;
b. a pair of elongated vane members having inner end regions near the hull and substantially planar outer end regions projecting away from the hull;
c. mounting means mounting the inner end regions on the hull for rotary movement about a common axis;
d. the substantially planar outer end regions extending in planes which obliquely intersect the common axis, to vanes being rotatably movable about the common axis to move such planes into and out of alignment with the flow-steam of water passing alongside the hull when the watercraft is moving forwardly to concurrently serve steering and heeling functions;
e. the vane members remaining substantially submerged while serving such steering and heeling functions.

4,040,374

AUTOMATIC PILOT FOR A SAILBOAT

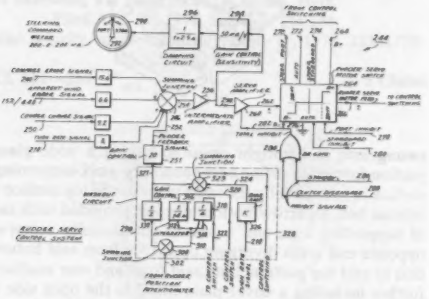
Leonard M. Greene, Chappaqua, N.Y., assignor to Safe Flight Instrument Corporation, White Plains, N.Y.

Continuation-in-part of Ser. No. 452,265, March 18, 1974, abandoned, which is a continuation of Ser. No. 220,768, Jan. 26, 1972, abandoned. This application Dec. 2, 1975, Ser. No. 636,834

Int. Cl.[2] B63H *25/02;* **G05D** *1/00*

U.S. Cl. 114—144 C **6 Claims**

1. An automatic pilot for a sailboat having a rubber, a mast and sails supported from the mast, said automatic pilot comprising:
A. means to provide a first electric signal as a function of the angular position of the rudder,
B. power means to vary the angular position of the rudder,
C. means to provide a second electric signal as a function of the prevailing angle of the apparent wind relative to the fore and aft position of the sailboat,
D. means to provide a third electric signal as a function of a desired angle of apparent wind relative to the fore and aft position of the sailboat,
E. means responsive to means (C) and (D) to provide a fourth electric signal as a function of the prevailing difference between the second and third electric signals,
F. means to provide a fifth electric signal as a function of the prevailing heading of the sailboat,
G. means to provide a sixth electric signal as a function of a desired heading of the sailboat,
H. means responsive to means (F) and (G) to provide a seventh electric signal as a function of the prevailing difference between the fifth and sixth electric signals, and
I. a mode selecting means having at least four modes which are OFF, WIND, COMPASS and STANDBY, said mode selecting means being so structured that the selection of WIND mode must be made between a selection of OFF mode and of COMPASS mode and that the STANDBY mode is positioned between the OFF mode and the WIND mode, said selecting means including
i. means operable when the selecting means is in the



WIND mode for connecting the means providing the first and fourth signals to the power means in a control loop which governs the heading of the sailboat to secure and maintain the desired angle of apparent wind relative to the fore and aft position of the sailboat,
ii. means operable when the selecting means is in the COMPASS mode for connecting the means providing the first and seventh signals to the power means in a control loop which governs the heading of the sailboat to secure and maintain the sailboat in the desired heading,
iii. said selecting means in the OFF mode providing no connection between the first and fourth electric signals and the power means and no connection between the first and seventh signals and the power means, and
iv. means operable when the selecting means is in the STANDBY mode for rendering the means generating the fifth, sixth and seventh electric signals operative.

4,040,375

BOAT STEERING SYSTEM

Frederick Joseph Atkins, West Roxbury, and Henry Rich Keene, Dedham, both of Mass., assignors to The Edson Corporation, New Bedford, Mass.

Continuation-in-part of Ser. No. 615,693, Sept. 22, 1975, abandoned. This application May 24, 1976, Ser. No. 689,371

Int. Cl.[2] B63H *25/10*

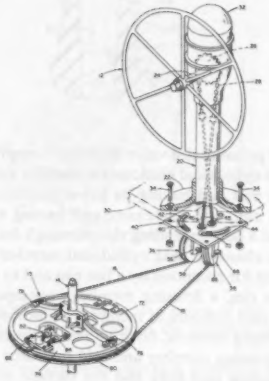
U.S. Cl. 114—160 **7 Claims**

1. In a boat steering system having
rudder post actuating means having portions extending radially outwardly from the axis of a rudder post
steering actuating means having portions extending radially outwardly from the axis of a steering shaft and
a pair of operating strands extending between said outwardly extending portions of said rudder post and steering actuating means
that improvement which consists of:
preassembled adjustable strand directing mechanism posi-

tioned between said rudder post actuating means and said steering actuating means for independently adjusting the direction of each of said operating strands, said mechanism comprising

an integral base plate defining a mounting plane and having a pair of spaced circular apertures of predetermined diameter for said operating strands, said apertures having spaced axes generally perpendicular to said mounting plane,

a pair of strand directing pulleys each having a peripheral strand supporting rim cooperating with one of said apertures for changing the direction of the strand passing therethrough, each said pulley being mounted for rotation in a plane perpendicular to said mounting plate plane



adjustable supporting means mounting each of said pulleys on said base plate for independent arcuate adjustment thereof in a plane parallel to said mounting plane while maintaining the rim of said pulley tangent to the axis of its cooperating base plate aperture

each said supporting means including

a link having a pulley rotatably mounted thereon, and

link mounting means permanently rotatably mounting said link on said base plate for arcuate movement about the axis of its cooperating base plate aperture and

locking means on said base plate and each said link for selectively securing each said link in arcuately adjusted position on said base plate.

4,040,376

COMPLETELY EXPENDABLE MINE ANCHOR LINE CUTTING TOOL

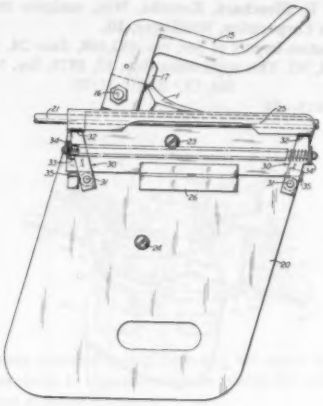
Joseph L. Giebel, Pittsburgh, Pa., assignor to Mine Safety Appliances Company, Pittsburgh, Pa.

Filed July 6, 1976, Ser. No. 702,912

Int. Cl.[2] B63B *9/00*

U.S. Cl. 114—221 A **4 Claims**

1. A completely expendable mine anchor line cutting tool comprising a cutter body having front and rear ends, a cutter therein slidable lengthwise of said body, the body having a bore behind the cutter for receiving an explosive charge, means attached to said body for receiving and holding a mine anchor in front of said cutter, means adapted to be actuated by said line for firing an explosive charge in said bore to drive the cutter foward through the line, a stabilizing fin disposed at one side of the cutter body, a retaining member overlapping the front portion of the fin and shaped to hook over a sweep line, a shear screw extending through said retaining member and fin and into the cutter body to connect them together, and means carried by the fin for locking the retaining member on a sweep line, said screw being week enough to be sheared off by movement of said body rearwardly relative to the fin due to recoil



when the tool is fired, whereby all of said tool will separate from a sweep line supporting it.

4,040,377

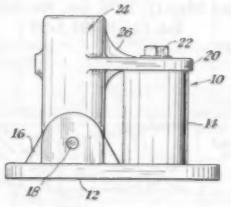
MOORING WHIP BASE

Robert H. Olsen, 106 SE. 10th St., Fort Lauderdale, Fla. 33316

Filed July 6, 1976, Ser. No. 702,468

Int. Cl.[2] B63B *21/08*

U.S. Cl. 114—230 **5 Claims**



1. A mooring whip base for anchoring a mooring whip to a dock or the like comprising:

a base plate;

a housing for receiving one end of a mooring whip, said housing including a wall forming a hollow receptacle for receiving said mooring whip end;

means connected directly to said base plate and to said housing for pivoting said housing relative to said base plate said housing being pivotable about a horizontal axis entending through the housing;

a substantially planar lever arm connected to and protruding from the outside of said housing at a point intermediate the ends of the housing; and

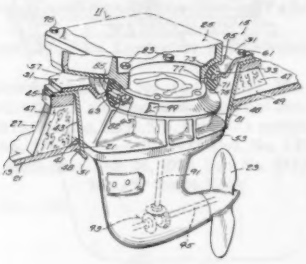
a resilient means disposed between said lever arm and said base plate and connected to said base plate and said lever arm.

4,040,378

METHOD AND APPARATUS FOR INSTALLING A MARINE PROPULSION DEVICE

Clarence E. Blanchard, Kenosha, Wis., assignor to Outboard Marine Corporation, Waukegan, Ill.

Continuation-in-part of Ser. No. 482,468, June 24, 1974, Pat. No. 3,968,767. This application Nov. 17, 1975, Ser. No. 632,268
Int. Cl.[2] B63H *21/30*
U.S. Cl. 115—74 13 Claims



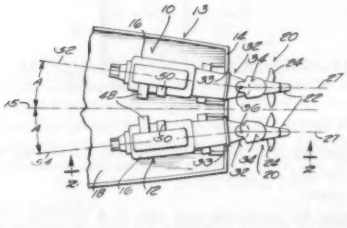
1. A boat hull including a bottom having thickness, said bottom having therein an aperture with a length through said bottom substantially equal to said thickness, a mounting collar having a sleeve portion which has a length substantially greater than the thickness of said boat hull bottom, which extends through said aperture, and which includes an upper end having a flange extending generally horizontally outwardly from said sleeve portion and in spaced relation above said boat hull bottom, means sealing said boat hull bottom to said sleeve portion of said collar, and rigidifying means extending between said boat hull bottom and said flange of said collar and comprising a circular series of angularly spaced, vertically extending members.

4,040,379

DUAL STERN DRIVE MOUNTING ARRANGEMENT

E. Douglas Betts, Gurnee, Ill., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed May 11, 1976, Ser. No. 685,298
Int. Cl.[2] B63H *5/08*
U.S. Cl. 115—37 5 Claims



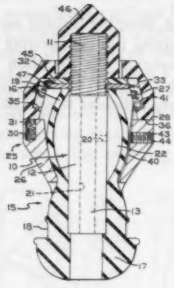
1. A boat comprising a boat hull having a centerline, and a pair of stern drive units supported by said boat hull and each including an engine, a shaft driven by said engine and having an axis of rotation extending at an angle to the boat centerline so that said axes converge in a rearward direction, a propulsion unit disposed rearwardly of said engine and including a propeller driven by said shaft, and means supporting said propulsion unit for steering movement relative to said boat hull, said propellers having rotary axis substantially parallel to each other and substantially parallel to the boat centerline when said propulsion units are in position for propelling said boat in a straight line.

4,040,380

LOW PRESSURE TIRE WARNING DEVICE

Nelson Claire Hess, Cuyahoga Falls, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Mar. 2, 1977, Ser. No. 773,454
Int. Cl.[2] B60C *23/04*
U.S. Cl. 116—34 R 10 Claims



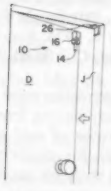
1. A low pressure tire valve assembly comprising a tire valve core unit, a cylindrical elastomeric member encompassing said valve core unit and having its lower portion secured to said valve core unit, said valve core unit having a threaded upper portion and a bore extending therethrough for communicating with a tire chamber, said cylindrical member having a lower plug portion for reception by a tire rim and to sealingly engage such a tire rim, a housing member encompassing the upper portion of said cylindrical member, an indicator cap mounted on said housing member, latching means operative to interconnect said housing member and said indicator cap, vent means interconnecting said bore and the surface areas between the outer peripheral surface of said tire valve core unit and the inner peripheral surface of said cylindrical member operative to distend said cylindrical member to position said latching means into operative position, valve cup means on said tire valve core unit retaining said cylindrical member and said housing member positioned on said valve assembly, means interconnecting said indicator cap and said valve cap means for relatively a predetermined distance, and spring means mounted on said housing member biasing said indicator cap outwardly for ejection from said housing member.

4,040,381

VISUAL BURGLAR ALARM

Gerard G. Keogh, Sr., and Gerard G. Keogh, Jr., both of 1101 Concordia Drive, Towson, Md. 21204

Filed Apr. 2, 1976, Ser. No. 672,845
Int. Cl.[2] G08B *13/08*
U.S. Cl. 116—86 13 Claims



1. A burglar alarm for installation on a doorway having relative opening and closing motion between first and second parts of the doorway, comprising: a housing for upright installation of a first part of a doorway, a magnet, said housing having a bore therein, means intermediate said housing for retaining the magnet within the housing, said means intermedi-

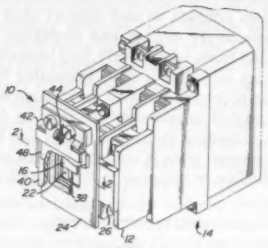
ate of the housing forming a constriction of said bore within said housing, means for lifting the magnet comprising a shank affixed to the magnet; means locatable on said second part of a doorway for causing the magnet when lifted to adhere magnetically adjacent said second part of a doorway, to fall within the housing on said relative opening motion between first and second parts of a doorway and to remain in the fallen position upon doorway reclosure; and means for affording visual indication of the position of the magnet with respect to the housing.

4,040,382

INDICATOR FOR RELAY OR THE LIKE

Howard H. Sheppard, 7430 Sprague St., Philadelphia, Pa. 19119

Filed June 11, 1976, Ser. No. 695,286
Int. Cl.[2] G08B *5/34*
U.S. Cl. 116—124 L **18 Claims**



1. An electrical device such as a relay or the like having means for indicating a condition of the contacts therein, comprising:

a contact operator element movable inwardly with respect to a casing or housing or an electrical device when the electrical device is operated;

guide means for slideably mounting an indicating element, said indicating element being movable between a first and a second position within said guide means; and

means operable by said contact operator element for holding said indicating element in said first position, said holding means including mechanical stop means, movement of said contact operator element inwardly with respect to the electrical device casing causing disengagement of the indicating element by said holding means whereby said indicating element may move from said first position to said second position indicating operation of said electrical device.

4,040,383

FUSER ROLL LUBRICATOR-CLEANER

John D. Vandervort, Cottage Grove, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

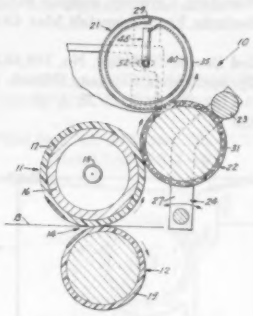
Filed Mar. 4, 1976, Ser. No. 663,682
Int. Cl.[2] B05C *11/00*
U.S. Cl. 118—60 **10 Claims**

1. A rotatable roll for dispensing liquid, comprising:

a first cylinder having an interior surface circumscribing a longitudinal axis of rotation and apertures therein defining an array substantially parallel to the axis of rotation;

a second cylinder mounted within said first cylinder and having outer and inner surfaces, the outer surface defining a narrow annular cavity with said interior surface, and the inner surface defining a reservoir for liquid and defining an air space above said reservoir; and

said second cylinder having a longitudinal opening defined in a preferred direction of rotation by extending, generally radially-directed flanges at leading and trailing longitudinal edges, said flange on the leading edge of the array extending inward for directing liquid from said reservoir into the cavity during rotation of the roll, said flange on the trailing edge of the opening extending outward and enclosing the cavity behind the apertures to define a second reservoir communicating with the apertures; and



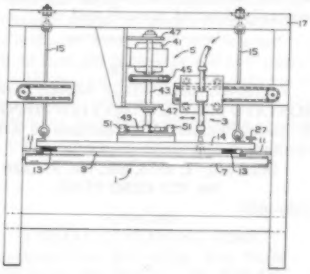
vent means communicating with said air space for venting air therefrom to equalize pressure within the roll with the ambient external pressure.

4,040,384

APPARATUS FOR SCRUBBING STAIN INTO SHEET OR BOARD MATERIAL

Elmer A. Lattner, Kirkwood, Mo., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Feb. 19, 1976, Ser. No. 659,391
Int. Cl.[2] B05C *11/02*
U.S. Cl. 118—120 **10 Claims**



1. An apparatus for scrubbing a stain into sheet and board material being conveyed through said apparatus, comprising:

A. a frame adapted to be positioned over a conveyor which conveys sheet or board material through said apparatus;

B. a structural member connected to said frame; the structural member having mounted thereto at least one strip brush arranged to contact the top surface of the material being conveyed through the apparatus, said strip brush extending substantially across the width of the material being conveyed;

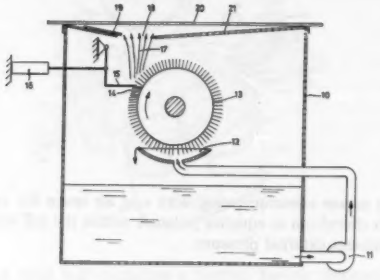
C. means mounted on said frame member and connected to said structural member for oscillating said structural member and said strip brush mounted thereon at varying frequency with various length strokes to scrub the stain into the surface of said sheet or board material.

4,040,385

APPARATUS FOR DEPOSITING FLUX-FLUID ONTO CONDUCTOR PLATES

Heinrich Tost, Nurnberg, Germany, assignor to Grundig E.M.V. Elektro-Mechanische Versuchsanstalt Max Grundig, Fuerth, Germany

Filed Dec. 8, 1976, Ser. No. 748,641
Claims priority, application Germany, May 3, 1976, 7613874
Int. Cl.[2] B05B *1/28, 3/08*
U.S. Cl. 118—326 **7 Claims**



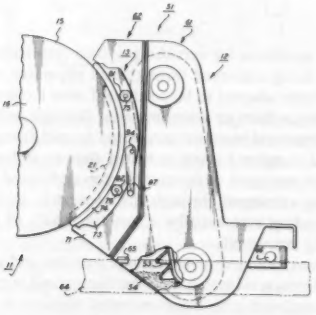
1. An apparatus for depositing flux-fluid onto a conductor plate including in combination: a housing containing a source of said flux-fluid; an open receptacle bath disposed within said housing and above said source; a horizontally disposed rotary brush having flexible bristles in functional association with said receptacle; conduit means including a pump device communicating said source and receptacle whereby said receptacle is charged and excess flux-fluid overflows the receptacle and is returned to the source; an adjustable stripping bar disposed in the path of said brush bristles; said housing including a cover member having an adjustable despensing slot in operative association with said brush and stripper bar; and said cover being inclined downwardly towards said slot; a guidance path for said conductor plate above said housing and in operative association with said slot; whereby upon rotation of said brush, the bristles are flexed and sprung by said stripper bar to effect a spray of said flux-fluid through said slot and onto said conductor plate and whereby flux-fluid spray intercepted by said cover is generally directed towards said slot.

4,040,386

RETRACTABLE EDGE SEALS FOR ELECTROSTATOGRAPHIC DEVELOPMENT SYSTEMS

Richard E. Smith, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed May 1, 1975, Ser. No. 573,636
Int. Cl.[2] G03G *15/08*
U.S. Cl. 118—653 **9 Claims**



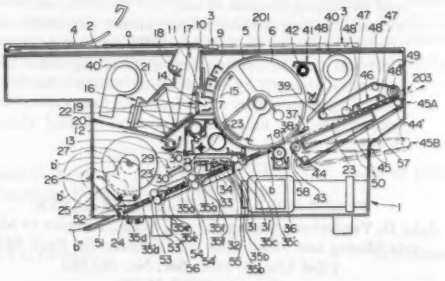
1. In a development system for developing latent electrostatic images carried by an imaging surface of an electrostatographic processor as said imaging surface moves through a development zone; said development system including a housing having a sump for storing a supply of developer, and means within said housing for circulating developer along a path running from said sump, through said development zone, and then back into said sump; the improvement comprising at least one retractable sealing means mounted on said housing for movement toward and away from said imaging surface independently of said housing; said sealing means being aligned with one edge of said development zone to selectively seal and unseal said development zone along said edge while said housing is maintained in a predetermined position, said sealing means comprising a support plate mounted on said housing for movement toward and away from said imaging surface, a resilient member secured to said support plate in facing relationship with said imaging surface and in alignment with said one edge of said development zone, and a manually controlled drive mechanism coupled to said support plate to enable an operator to selectively engage and disengage said resilient member with and from, respectively, said imaging surface, said drive mechanism including a shaft journalled for rotation in said housing, an eccentric mounted for rotation with said shaft, and a crank coupled to said shaft for rotating said eccentric; said eccentric extending through a slot in said support plate, whereby said support plate is cammed toward and away from said imaging surface in response to the rotation of said eccentric.

4,040,387

ELECTROSTATIC PHOTOGRAPHIC COPYING APPARATUS

Takaji Washio, Toyonaka; Koichi Sasaki, and Tatsuo Aizawa, both of Osaka, all of Japan, assignors to Mita Industrial Co. Ltd., Osaka, Japan

Division of Ser. No. 399,516, Sept. 21, 1973, Pat. No. 3,923,391.
This application Apr. 22, 1975, Ser. No. 570,428
Claims priority, application Japan, Sept. 24, 1972, 47-95460
Int. Cl.[2] G03G *15/09*
U.S. Cl. 118—658 **4 Claims**



1. An electrostatic latent image developing device comprising:

a developing chamber containing a magnetic developer;

a rotating magnetic brush means comprising a nonmagnetic, hollow, cylindrical, rotating sleeve provided within said developing chamber and a magnetic field forming stationary member disposed within said sleeve, said magnetic field forming stationary member having a magnet and a magnetic field shielding member made of a non-magnetized magnetic material, said magnet being disposed so that it forms a magnetic field sufficient for attracting and retaining a developer in an area extending in the rotating direction of the sleeve between a developer pumping position and a developing position, said magnetic field-shielding member being disposed so that it weakens the magnetic field to an extent, wherein the field is incapable

of retaining the developer on the surface of the sleeve in at least part of an area extending in the rotating direction of said sleeve between the developing position and the developer pumping position, whereby said rotating magnetic brush means repeats a cycle of pumping the developer up onto the surface of said sleeve in the developer pumping position, transporting it to the developing position, developing an electrostatic latent image forming surface and then removing an excess of the developer from the surface of said sleeve with the rotation of the sleeve;

a toner supply chamber communicating with said developing chamber through a toner supply opening formed at the bottom of the chamber;

a toner supply means for supplying a toner powder from said toner supply chamber to said developing chamber;

said toner supply means including a toner supply roller having a plurality of grooves and cantilevered flexible members, said toner supply roller being disposed rotatably at the toner supply opening so that its top surface is situated in said toner supply chamber and its bottom surface in said developing chamber, said flexible members having free edges and being positioned at the toner supply opening so that free edges make elastic contact with the surface of said toner supply roller situated within the developing chamber, said toner supply roller and said flexible members cooperating to close the toner supply opening substantially and feeding the toner powder contained in the toner supply chamber to said developing chamber by rotation of the toner supply roller; and

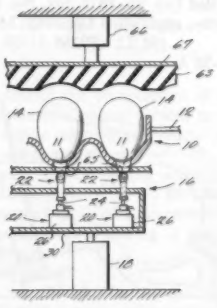
a toner supply cartridge capable of being rotatably mounted in said toner supply chamber, said cartridge comprising an elongated hollow receptacle having an enclosing side wall and end faces, said receptacle containing a supply of toner powder inside, said hollow receptacle having an opening extending in the side wall and sealed by an openable sealing member, said opening being of such a shape and size that when it is opened and positioned to face downwardly, the toner powder contained therein is uniformly discharged generally along the entire length of the hollow receptacle, and at least one of the end faces of said hollow receptacle being made of a transparent or semi-transparent material and having a mark indicating the position of said opening.

4,040,388

METHOD AND APPARATUS FOR AUTOMATIC EGG INJECTION

Gary E. Miller, Salt Lake City, Utah, assignor to Agrimatic Corporation, Cerritos, Calif.

Filed Feb. 27, 1976, Ser. No. 662,257
Int. Cl.² A01K *45/00*
U.S. Cl. 119—1 **12 Claims**



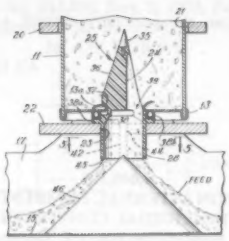
1. A method of injecting a fluid into an egg comprising: heat-sterilizing the exterior surface of a portion of the shell of the egg; driving a hollow needle having a squared-off end through the sterilized shell portion thereby forming a hole in the shell; injecting fluid through the needle into the egg; withdrawing the needle from the hole; sealing the hole by heat-coagulating a small portion of the egg albumin at the location of the hole; and heat-sterilizing the needle.

4,040,389

ANIMAL FEEDING DEVICE

James H. Walters, 1219 Carriage Place, Kalamazoo, Mich. 49008

Filed Sept. 12, 1975, Ser. No. 612,763
Int. Cl.² A01K *5/00*
U.S. Cl. 119—52 R **8 Claims**



1. An animal feeding device for non-liquid feed comprising tray means adapted to receive food and to make it accessible to an animal, container holding means spaced from said tray means, container perforating means having an upwardly projecting perforating portion tapering upwardly to a perforating point and a downwardly projecting discharge portion, said container perforating means being located in the center bottom portion of the container holding means and said perforating portion having channel means communicating from adjacent said perforating point essentially vertically downward to said discharge portion, whereby when a container having a bottom perforatable wall is inserted into said container holding means with the perforatable wall apposed to said perforating means and pushed down, the perforating means will perforate the perforatable wall and bring the channel means into said container, said channel means communicating directly with the portion of the container immediately adjacent said perforatable wall so that food from the bottom of said container can gravitate through said channel means into said discharge portion and out into said tray, and in which disposed beneath the discharge portion is a feed distributing means adapted to cause the food to move toward an accessible portion of the tray means.

4,040,390

ANIMAL GROOMING TOOL

James E. Rosenbaum, Box 400, Keller, Tex. 76248

Filed Jan. 12, 1976, Ser. No. 648,245
Int. Cl.² A01K *13/00*
U.S. Cl. 119—86 **9 Claims**

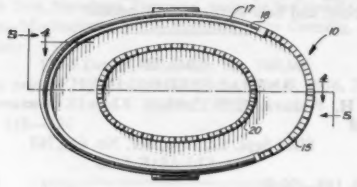
1. A multi-purpose grooming and shedding tool for animals including in combination:

a body member made of plastic material and having a support surface and a curved depending portion extending downwardly around the periphery of the support surface, said portion having first and second parts located thereon;

grooming teeth integrally formed with said body member of a first predetermined size on said first part of the curved depending portion of said body member;

a curved shedding blade comprising a hacksaw blade having teeth of a second smaller predetermined size on said second part of the curved depending portion of said member; and

an additional set of depending teeth attached to a further curved depending portion of said body member and space



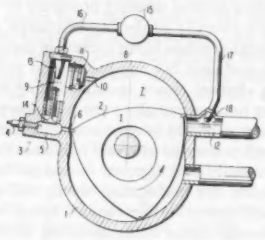
inwardly from the periphery thereof a predetermined distance.

4,040,391

ROTARY PISTON INTERNAL COMBUSTION ENGINE OF TROCHOIDAL CONSTRUCTION

Karl Zeilinger, Berglen-Hosslinswart, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany

Filed Oct. 22, 1975, Ser. No. 624,943
Claims priority, application Germany, Nov. 8, 1974, 2453047
Int. Cl.[2] F02B *53/10*
U.S. Cl. 123—8.09 **10 Claims**



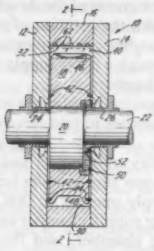
1. A rotary piston internal combustion engine which includes a casing means and a piston means rotating in the casing means, working space means formed by said casing means and said piston means, inlet and exhaust channel means for the working space means, means for supplying a quantity of fuel into the inlet channel means so as to form a lean fuel-air mixture therein, an ignition chamber means in communication with a working space means and including a spark plug and an inlet for a fuel-air mixture, and overflow channel means in communication with a working space means, characterized in that an intermediate chamber means is interposed between the overflow channel means and the ignition chamber means with the inlet for the fuel-air mixture communicating the intermediate chamber means with the ignition chamber means, an injection nozzle means communicating with the fuel supplying means is arranged in the intermediate chamber means for injecting a quantity of fuel into the intermediate chamber means so as to enrich the lean fuel-air mixture sucked-in out of the inlet channel means and conducted to the intermediate chamber means by the overflow channel means, and in that valve means for the control of the gas interchange between the intermediate chamber means and the ignition chamber means and between the intermediate chamber means and the overflow channel means are respectively arranged in the inlet for the fuel-air mixture and in the overflow channel means.

4,040,392

ROTARY ENGINE MODIFIED FOR LOW EMISSIONS

George H. Woodier, Ringwood, N.J., assignor to Curtiss-Wright Corporation, Wood-Ridge, N.J.

Filed June 11, 1976, Ser. No. 695,046
Int. Cl.[2] F02B *53/00*
U.S. Cl. 123—8.45 **3 Claims**



1. A rotary combustion engine comprising:

a. an outer body having a peripheral wall and a pair of side walls defining an internal cavity and having an axis transverse to said side walls, the inner surface of said peripheral wall having a multi-lobe profile in which the lobes are joined by regions disposed relatively near to said axis;

b. an inner body of generally polygonal profile mounted for relative rotation within said outer body cavity, the apex portions of said inner body having sealing cooperation with said multi-lobe peripheral surface to define a plurality of working chambers which vary in volume in response to said relative rotation;

c. said outer body also having an intake port and an exhaust port for communication with said working chambers and disposed adjacent to and on opposite sides of one of said near-axis regions; and

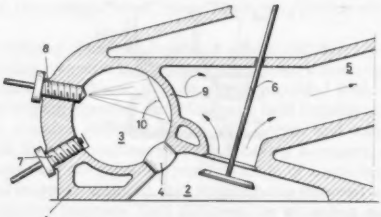
d. said outer body having a plurality of side-by-side circumferentially-extending grooves in its multi-lobe periperal surface adjacent to a near-axis region at which combustion takes place, said grooves being positioned so that an apex portion of the inner body does not reach said grooves until the working chamber on it trailing side has closed to said intake port.

4,040,393

IGNITED INTERNAL COMBUSTION ENGINE OPERATED WITH CHARGE STRATIFICATION

Gerd Decker, Vorsfelde; Dieter Steinke, and Kurt Reichel, both of Wolfsburg, all of Germany, assignors to Volkswagenwerk Aktiengesellschaft, Germany

Filed Feb. 28, 1975, Ser. No. 554,085
Claims priority, application Germany, Mar. 8, 1974, 2411080
Int. Cl.[2] F02M *31/00*
U.S. Cl. 123—30 A **5 Claims**



1. In a spark ignited internal combustion engine operated with charge stratification and including a cylinder head having

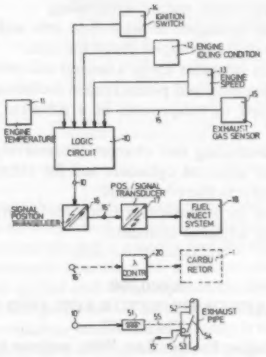
a main combustion chamber, an auxiliary combustion chamber connected to the main combustion chamber through a connecting passage, fuel delivery means for supplying fuel to the auxiliary combustion chamber, ignition means for igniting a fuel-air mixture in the auxiliary combustion chamber, and an intake and an exhaust conduit communicating with the main combustion chamber; the improvement wherein:

the auxiliary combustion chamber has at least one wall portion in heat exchange relationship with hot exhaust gases flowing through the exhaust conduit from the main combustion chamber of the internal combustion engine, the auxiliary combustion chamber being positioned in the immediate vicinity of the exhaust conduit in such a manner that the wall portion of the auxiliary combustion chamber in heat exchange relationship with hot exhaust gases flowing through the exhaust conduit from the main combustion chamber projects into the exhaust conduit, whereby hot exhaust gases flowing through the exhaust conduit flow externally around the wall portion of the auxiliary combustion chamber to heat the auxiliary combustion chamber and maintain the auxiliary combustion chamber at an elevated temperature so that fuel components of a fuel-air mixture in the auxiliary combustion chamber are rapidly evaporated.

4,040,394
APPARATUS REPETITIVELY CONTROLLING THE COMPOSITION OF EXHAUST EMISSIONS FROM INTERNAL COMBUSTION ENGINES, IN PREDETERMINED INTERVALS

Josef Wahl, Stuttgart; Peter Jurgen Schmidt, Schwieberdingen, and Richard Zechnall, Stuttgart, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Division of Ser. No. 396,477, Sept. 12, 1973, Pat. No. 3,919,983. This application July 21, 1975, Ser. No. 597,561
Claims priority, application Germany, Sept. 14, 1972, 2245029
Int. Cl.[2] F02B *3/00*
U.S. Cl. 123—32 EA **17 Claims**



1. Apparatus to control the composition of exhaust gases from an internal combustion engine subject to operating parameters including engine temperature, engine power, engine speed, and ignition switch operation,

said apparatus having an exhaust gas sensor **(15)**, a fuel-air mixture and balance means **(17, 18, 19, 20)** adjusting the relative proportion of fuel and air supplied to the engine; and means **(11, 12, 13, 14)** sensing at least one of said operating parameters;

said apparatus comprising

a first timing circuit **(23)** generating and operating time signal having a limited duration with respect to the operating time of the engine after starting of the engine and subsequent to the engine having been stopped;

a first logic circuit **(22)** connected to at least one of said operating parameters and having its output connected to and controlling said first timing circuit **(23)** to start a timing interval of said limited time duration upon energization by said logic circuit **(22)**;

a second timing circuit **(22, 40)**;

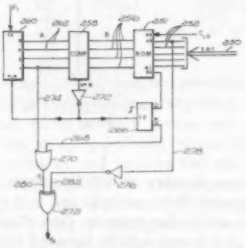
a second logic circuit **(29)** connecting the output of said first timing circuit **(23)** to the second timing circuit **(32, 40)**:

and gating means **(33)** enabled by the output of said second timing circuit connecting the output signal from the exhaust sensor **(15)** to said balance means **(17, 18, 19, 20)**.

4,040,395
ENGINE SELECTIVELY UTILIZING HYBRID THERMODYNAMIC COMBUSTION CYCLES

Mihai C. Demetrescu, 17761 Palmento Way, Irvine, Calif. 92715

Division of Ser. No. 413,070, Nov. 5, 1973, Pat. No. 3,996,915. This application Mar. 21, 1975, Ser. No. 560,672
Int. Cl.[2] F02B *3/00*
U.S. Cl. 123—32 EA **6 Claims**



1. A method of operating a multiple cylinder, internal-combustion engine, comprising the steps of:

storing a plurality of output-torque code words;

providing a signal to indicate a desired level of output torque for said engine;

selecting at least a pair of said code words under control of said signal indicative of desired output torque;

developing at least said select pair of said code words to obtain specific combustion patterns for said engine, representative of actuation patterns to selectively burn fuel in the cylinders of said engine to provide different levels of output torque;

generating a series of actuating pulses coinciding to said combustion patterns; and

applying said actuating pulses to said engine to selectively actuate combustion events in each of said cylinders.

4,040,396
FUEL INJECTION VALVE FOR INTERNAL COMBUSTION ENGINE

Hitoshi Tomita, Saitama, Japan, assignor to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Mar. 27, 1975, Ser. No. 563,002
Claims priority, application Japan, Mar. 29, 1974, 49-35081[U]
Int. Cl.[2] F02B *3/00*; F02M *39/00*
U.S. Cl. 123—32 JV **3 Claims**

1. In a fuel injection valve for an internal combustion engine including a valve body having a central bore sealably and slidably mounting a needle valve and formed with an oil pool adjacent a circular valve seat which is closed off by the tip end of the needle valve, the improvement comprising:

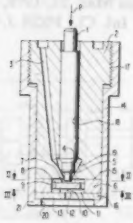
a planar passage member fixedly abutting and underlying the discharge end of the valve body, and

a planar nozzle member fixedly abutting and underlying said passage member and having a small diameter nozzle opening concentric with the valve seat and needle valve,

said planar passage member including on its upstream face, facing said valve body, a first central recess extending

radially beyond said circular valve seat and acting as a direct axial extension of the valve body central bore and including an axial end face for deflecting flow radially outwardly, and said planar passage member including circumferentially spaced through holes extending through said passage member parallel to its axis at positions radially outwards of said circular valve seat and being in fluid communication with said upstream face first central recess of said passage member,

and at least one of said planar members including a second central recess open to the downstream face of said passage member and overlying said nozzle opening and in fluid communication with said through holes by fluid passages extending tangentially from said second central recess to said through holes,



and wherein a plurality of radial passages corresponding to said tangential fluid passages and said through holes are provided within the upstream face of said planar passage member and extend radially outward from the first central recess therein to respective through holes, and said tangential passages lead from said through holes within said downstream face of said passage member to said second central recess whose diameter is in excess of the diameter of said opening within said nozzle member;

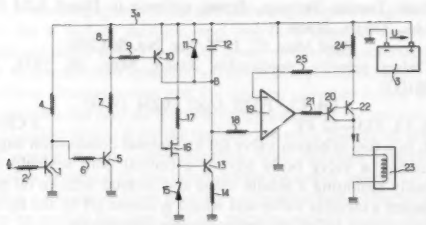
whereby, fuel entering said second central recess by way of said tangential fluid passage is subjected to a gyrating flow prior to immediate discharge through the central nozzle opening with improved atomization thereof.

4,040,397

CONTROL OF ELECTROMAGNETIC FUEL INJECTORS IN INTERNAL COMBUSTION ENGINES

Claude Leichle, Le Pecq, France, assignor to Regie Nationale des Usines Renault, Boulogne-Billancourt and Automobiles Peugeot, Paris, both of, France

Filed Sept. 5, 1975, Ser. No. 610,775
Claims priority, application France, Sept. 9, 1974, 74.30510
Int. Cl.[2] F02B 3/00
U.S. Cl. 123—32 AE **11 Claims**



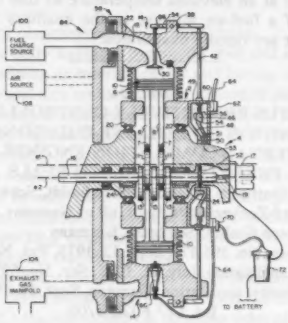
1. A control device for controlling the initiation operation of an electromagnetic fuel injector in an internal combustion engine having a storage battery, said fuel injector having a coil, comprising: voltage comparator means, first and second input terminals on said voltage comparator means, a resistor connected to said first input terminal, means for series connecting said resistor to said coil of said fuel injector, a capacitor connected to said second input terminal, electric current generator means for generating a constant electric current, means connecting said electric current generator means to said capacitor for causing said constant electric current to charge said capacitor, and limiting means connected to said capacitor for limiting the maximum charge of said capacitor to a predetermined fixed value, whereby the build-up time for said fuel injector coil is retained constant, regardless of changes in voltage supplied by said storage battery.

4,040,398

FOUR-CYCLE ROTARY ENGINE AND METHOD OF OPERATION THEREFOR

Roger Evan Billings, and Franklin Earl Lynch, both of Provo, Utah, assignors to Engine Research, Provo, Utah

Filed Dec. 8, 1975, Ser. No. 638,665
Int. Cl.[2] F02B 57/08
U.S. Cl. 123—44 R **7 Claims**



1. A four-cycle rotary engine comprising

a cylinder unit rotatable about a first axis and having six cylinders radially arranged about the axis,

a piston system rotatable about a second axis which is offset from said first axis, said piston system including six pistons each disposed to reciprocate in a different one of the cylinders,

means for introducing fuel charges successively into alternate pairs of adjacent cylinders and for exhausting combustion products therefrom, and

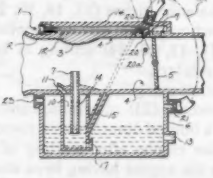
ignition means for successively firing fuel charges in alternate pairs of adjacent cylinders.

4,040,399

BACK DRAFT CARBURETOR FOR TWO CYCLE ENGINES

James R. Meininger, Fond du Lac, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed June 11, 1975, Ser. No. 585,864
Int. Cl.[2] F02M 5/08
U.S. Cl. 123—65 R **14 Claims**



1. In a carburetor for a two stroke engine including a body,

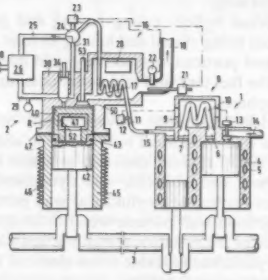
float bowl fuel chamber, a main fuel supply system including a main fuel nozzle and an idle fuel supply system including an idle fuel jet, each system communicating with a bottom portion of said float bowl, an air intake, a venturi, a throat section downstream of said venturi, and a throttle plate-type valve rotationally mounted in the throat; a back draft fuel economizing means comprising; means opening into the carburetor throat and responsive to the proximity of the throttle valve for creating a vacuum source, passage means for connecting said means for creating a vacuum with the air space above the fuel in said float bowl, and means for venting one of said passage means and float bowl to the atmosphere to limit the effect of said vacuum upon said float chamber, said means for creating a vacuum source comprising an orifice positioned substantially upstream of the throttle valve plate when said valve plate is positioned for idle and opening into the carburetor throat at a preselected point directly opposite a peripheral edge of the throttle valve plate when said throttle valve is sufficiently open to inactivate said idle fuel supply system and render the main fuel supply system fully operative and is further positioned to provide a selected minimum cruising RPM of the engine, said orifice and valve plate utilizing the venturi effect therebetween to create said vacuum.

4,040,400

INTERNAL COMBUSTION PROCESS AND ENGINE

Karl Kiener, 7081 Goldshofe, Ostalbkreis, Germany

Filed Sept. 2, 1975, Ser. No. 609,726
Int. Cl.[2] F22B *11/00*
U.S. Cl. 123—68 **25 Claims**



1. An internal combustion process wherein combustion-supporting air is compressed outisde of a working cylinder-piston and compressed air and a gaseous fuel are supplied separately in predetermined quantities to a burner nozzle and mixed therein and ignited and burnt without increasing the pressure in the cylinder-piston and wherein the energy of the combustion gases which expand without cooling is transmitted to the working piston and the exhaust gases are removed from the working cylinder, characterized in that the combustion-supporting air is compressed substantially isothermally then heated by the hot exhaust gases with some of the compressed hot air being diverted to preheat and carburet and compress the fuel with the remainder of the combustion-supporting air and the combustible gas evolved being burnt substantially stoichiometrically by self-ignition.

4,040,401

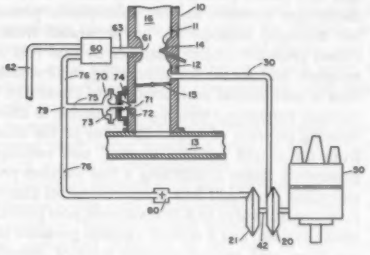
SPARK VACUUM ADVANCE CONTROL

Frederick J. Marsee, Clawson, Mich., assignor to Ethyl Corporation, Richmond, Va.

Filed Nov. 5, 1974, Ser. No. 521,035
Int. Cl.[2] F02P *5/04*; F02M *25/06*
U.S. Cl. 123—117 A **14 Claims**

1. In an ignition spark advance system for use with spark ignited internal combustion engines comprising in combination

a. an ignition distributor having a spark advance mechanism operated by a first vacuum actuated spark advance means,
b. a carburetor having a spark advance port,
c. a vacuum line operably connecting said spark advance port with said first spark advance means,
d. a vacuum actuated exhaust gas recycle valve, and
e. an EGR vacuum amplifier having a vacuum line operatively connected to and adapted to modulate said exhaust



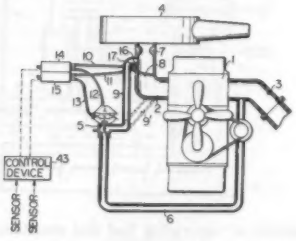
gas recycle valve in response to operating conditions of said engine, the improvement comprising a second vacuum actuated spark advance means, said second spark advance means being operatively connected to said EGR vacuum amplifier by said vacuum line and actuated by a vacuum signal from said EGR vacuum amplifier, said first and said second spark advance means cooperating in advancing the timing of said ignition spark advance system when said exhaust gas recycle valve is open.

4,040,402

EXHAUST GAS RE-CIRCULATION SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Hidetaka Nohira; Kiyoshi Kobashi, and Masaaki Tanaka, all of Susono, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Feb. 13, 1976, Ser. No. 658,109
Claims priority, application Japan, Oct. 11, 1975, 50-121799
Int. Cl.[2] F02M *25/06*
U.S. Cl. 123—119 A **9 Claims**



1. An exhaust gas re-circulation system for an internal combustion engine, comprising

an exhaust gas re-circulation pipeline extending between intake and exhaust systems of the internal combustion engine for re-introducing a part of the exhaust gas from the exhaust system into the intake system,

a single flow-control valve for regulating the flow of the re-introduced exhaust gas, which valve comprises: an orifice element arranged in a portion of the exhaust gas re-circulation pipeline to provide said portion with an orifice through which the exhaust gas flows from said exhaust system toward said intake system; a valve element movably placed over the orifice and having an axially extended valve stem; a first displaceable diaphragm mem-

ber connected to the valve stem for actuating movement of the valve element away from said orifice; a second displaceable diaphragm member axially spaced apart from the first diaphragm member and having means for limiting the movement of said valve element; a first closed pressure-control chamber defined between the first and second diaphragm members; a second closed pressure-control chamber arranged adjacent to, but separated from said first closed pressure-control chamber by said second diaphragm member, and; an atmospheric pressure chamber arranged adjacent to, but separated from said first closed pressure-control chamber by said first diaphragm member, and means for generating in first said first and then in said second pressure-control chambers, individual vacuum pressures changing in response to change in the opening position of a throttle valve of the intake system from the closed position thereof, said vacuum pressure generating means comprising a first vacuum pressure line extending from said first pressure-control chamber of the flow-control valve to a first vacuum port provided in said intake system, and a second vacuum pressure line extending from said second-pressure control chamber of the flow-control valve to a second vacuum port provided in said intake system, said first and second vacuum ports being located such that when said throttle valve is opened gradually from the closed position thereof, an edge of said throttle valve moves past said first and second vacuum ports in sequence, said separate vacuum pressures of said first and second pressure-control chambers causing sequential displacements of said first and second diaphragm members thereby moving said valve element away from said orifice in a two step-like manner.

4,040,403

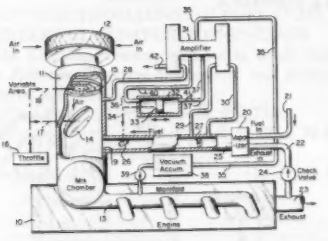
AIR-FUEL MIXTURE CONTROL SYSTEM

William Lester Rose, 2114 Rhonda Street, and Herbert Joe Johnson, 1250 Bluebell Street, both of Oxnard, Calif. 93030

Continuation-in-part of Ser. No. 444,361, Feb. 21, 1974, Pat. No. 3,931,801. This application Nov. 24, 1975, Ser. No. 634,625

Int. Cl.[2] F02M *17/18, 17/22*

U.S. Cl. 123—133 **12 Claims**



1. A method of vaporizing fuel and maintaining a desired ratio of air to fuel mixture in an internal combustion engine including the steps of:

a. holding the temperature of a liquid fuel and a diluent gas substantially constant prior to mixing:

b. mixing said diluent gas with said liquid fuel such that an excess of fuel is provided to super saturate the gas with fuel;

c. separating out fuel droplets from the super saturated gas by passing the mixture of diluent gas and liquid fuel through a change of momentum separator to provide gas saturated with vaporized fuel resulting in fuel vapor at the dew point;

d. passing the fuel vapor at dew point along a direction to mix with incoming air;

e. generating an air signal constituting a function of the air flow per unit time;

f. generating a fuel signal constituting a function of the fuel flow per unit time while in the vaporized state; and

g. controlling the fuel flow per unit time along said direction in accordance with a given relationship between the generated signals to thereby maintain a desired ratio of air-to-fuel mixture in said internal combustion engine.

4,040,404

FUEL TANK PRESSURE-VACUUM RELIEF VALVE

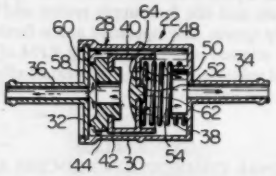
Katsuhiro Tagawa, Fussa, Japan, assignor to Nisson Motor Company, Limited, Yokohama, Japan

Continuation of Ser. No. 442,336, Feb. 14, 1974, abandoned. This application Jan. 19, 1976, Ser. No. 650,153

Claims priority, application Japan, Feb. 17, 1973, 48-20950

Int. Cl.[2] F02M *59/00*

U.S. Cl. 123—136 **3 Claims**



1. A pressure relief valve for a fuel tank of a motor vehicle equipped with an evaporative emission control system, said valve comprising:

a cylindrical hollow casing having end portions said end portions being closed and having an inlet and outlet at said both end portions, respectively, said inlet communicating with the fuel tank and said outlet communicating with the atmosphere;

a cylindrical movable valve element coaxially disposed within said cylindrical hollow casing and being in spaced relationship thereto and also in space relationship with said both end portions, said cylindrical movable valve element including a cylindrical wall portion and an annular partition wall portion which is integral with the inner surface of the cylindrical wall portion adjacent one end of said cylindrical movable valve element, the one end being adjacent to one hollow casing end portion having the outlet, the annular partition wall portion having at least one radially outward hole therethrough;

a compression spring interposed between the inner surface of the one hollow casing end portion having the outlet and the annular partition wall portion of said cylindrical movable valve element to bias said cylindrical movable valve element in the direction of another hollow casing end portion having the inlet;

an annular resilient valve member mounted at its central portion on the annular partition wall portion of said cylindrical movable valve element, said annular resilient valve member having at its peripheral portion a flexible flap portion which is located opposite said compression spring with respect to the annular partition wall portion, the flexible flap portion normally urgingly closing the hole of the annular partition wall portion and opening the hole to introduce atmospheric air therethrough from the outlet of said cylindrical hollow casing to the inlet of said cylindrical hollow casing when fuel vapor pressure in the fuel tank drops bellow zero gage pressure; and

a cylindrical resilient valve member securely mounted on the another end of said cylindrical movable valve element adjacent to the inlet of said cylindrical hollow casing, said cylindrical resilient valve member being formed with a central bore therethrough and an annular lip portion which is normally urged by said compression spring into sealingly contact with the inner surface of the another

hollow casing end portion having the inlet, said cylindrical resilient movable valve member being moved to a position which unseats the lip portion from the inner surface so as to introduce fuel vapor from the fuel tank through the inlet of said cylindrical hollow casing and around said cylindrical movable valve element to the outlet of said cylindrical hollow casing when the fuel vapor pressure in the fuel tank exceeds a predetermined value.

4,040,405

FUEL INJECTION SYSTEM FOR INTERNAL COMBUSTION ENGINE

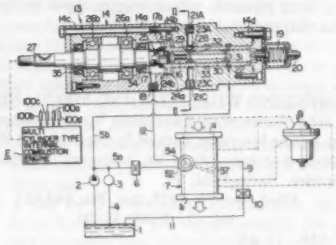
Eizi Tanaka, Anjo; Hiroshi Mochizuki; Tooru Kosuda, both of Okazaki; Seikou Abe, Nishio, and Michihiro Ohashi, Handa, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed June 8, 1976, Ser. No. 693,951

Claims priority, application Japan, June 10, 1975, 50-70292; July 4, 1975, 50-83049

Int. Cl.[2] F02M *69/00*

U.S. Cl. 123—139 BG **10 Claims**



1. A fuel injection system for a multi-cylinder type internal combustion engine comprising:

a. fuel delivery means for regulating the pressure of fuel at a predetermined level and delivering fuel as a first and a second flows;

b. fuel pressure control means for changing the pressure of the first fuel flow delivered from said fuel delivery means in response to the quantity of intake air inducted into the engine, said fuel pressure control means comprising

i. a housing having an intake air passage adapted to be connected to an intake pipe of the engine,

ii. a sensor valve disposed in said intake air passage, the rotating angle of said sensor valve being in proportion to the quantity of intake air passing through said intake air passage,

iii. a sensor valve shaft connected to said sensor valve for rotation in unison therewith, said sensor valve shaft having a cutout portion formed at a part thereof,

iv. a fuel metering cylindrical bearing, disposed in said housing, for supporting said sensor valve shaft and provided with a fine parallel slit which defines with said cutout portion of the sensor valve shaft a control orifice,

v. a fuel differential pressure regulating valve for maintaining the pressure across said control orifice substantially at a predetermined level,

vi. a first fuel passage for delivering the fuel from said fuel delivery means to said control orifice and said fuel differential pressure regulating valve,

vii. a second fuel passage for admitting to the exterior of the fuel pressure control means the fuel pressure at the upstream of said control orifice,

viii. compensation means disposed within said intake air passage in said housing in the proximity of said sensor valve for compensating the sectional area of said intake air passage, and

ix. pressure-activated means operatively coupled to said sensor valve for maintaining the differential pressure across said sensor valve at a predetermined level;

c. fuel metering means for metering and distributing the second fuel flow from said fuel delivery means in response to the controlled pressure of the fuel from the outlet of said fuel pressure control means, said fuel metering means comprising

i. a housing having a plurality of fuel intake ports equal in number to the cylinders of the engine,

ii. a rotor disposed in said housing and adapted to be operatively coupled to said engine for rotation in synchronism with the crankshaft of said engine, said rotor having a slit which, upon rotation of said rotor, intermittently and sequentially communicate with said fuel intake ports of said housing,

iii. a control shaft axially slidably fitted into said rotor, said control shaft being provided with an annular groove which normally communicates with said slit of said rotor with an opening area, said opening area varying in response to the axial displacement of said control shaft,

iv. a pressure chamber formed within said housing so that the controlled pressure of the fuel in said pressure chamber may be transmitted to said control shaft, said pressure chamber being in communication with said second fuel passage of said fuel pressure control means, and

v. a fuel passage for delivering the fuel of said second flow from said fuel delivery means to said annular groove of said control shaft; and

d. a plurality of fuel injection nozzles equal in number to the cylinders of said engine, said fuel injection nozzles respectively communicate with said fuel intake ports of said fuel metering means for injecting and delivering the metered fuel into said engine.

4,040,406

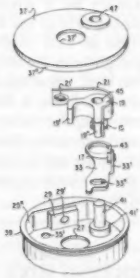
IGNITION BREAKER POINT ARRANGEMENT

John L. Baillargeon, Springfield, and Leonard W. Clifford, Wilbraham, both of Morocco, assignors to Eltra Corporation, Toledo, Ohio

Filed Jan. 6, 1975, Ser. No. 538,648

Int. Cl.[2] F02P *1/00;* **H01H** *19/62*

U.S. Cl. 123—146.5 A **2 Claims**



1. A breaker point assembly for a magneto ignition system comprising:

breaker box means for being mounted on an engine having a shaft rotatable in association with the operation of the engine and carrying a cam,

breaker point means mounted in said breaker box means for effecting ignition pulses in response to the rotational movement of the cam carried by the engine shaft,

said breaker box means including support means having a wall with an opening therethrough for receiving the engine shaft and cover means removably secured to said support means for enclosing the breaker point means,

said breaker point means including a breaker lever for movement about a pivot axis and having an arm carrying a

contact mounted on said support means and another arm for engaging the cam carried by the rotational engine shaft, and

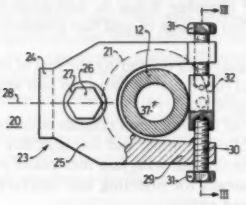
a pivot post constructed integrally with said support means, secured to the wall of said support means and providing an axis for the pivotal movement of said breaker lever, said cover means including a wall with an openings formed therein for receiving and holding the end of said pivot post upon being removably secured to said support means.

4,040,407

INTERNAL COMBUSTION ENGINE DISTRIBUTOR-BREAKER UNIT HOLDING AND ADJUSTMENT ARRANGEMENT

Joseph Heine, Vohrenbach, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

Filed Mar. 15, 1976, Ser. No. 666,587
Claims priority, application Germany, May 23, 1975, 2522829
Int. Cl.[2] F02P *5/04, 1/00*
U.S. Cl. 123—146.5 A **10 Claims**



1. Internal combustion engine distributor holding and adjusting arrangement, to secure a distributor **(10)** in adjusted position on the motor block **(20)** of the engine, having a housing **(11)**, a shaft **(12)** for insertion in the motor block **(20)** of the engine, means **(21, 23)** secured to the motor block **(20)** and engaging the distributor **(10)** to clamp the distributor to the motor block **(20)** including a releasable bolt **(26)** to tighten the distributor into frictional engagement with the block;

and a unitary boss concentric with said shaft **(12)** and formed with essentially parallel engagement surfaces to permit engagement therewith by a wrench located below the bottom of the housing **(11)** of the distributor and forming a thickened portion of said shaft **(12)** the engagement surfaces tapering slightly in the direction of the bottom of the housing **(11)** so that, upon application of rotary force to said engagement surfaces, a lifting force component will result to permit slight relative rotary movement between the shaft, and hence the distributor, and the motor block after said clamping means have clamped the distributor against the motor block to permit fine adjustment of ignition timing of the engine.

4,040,408

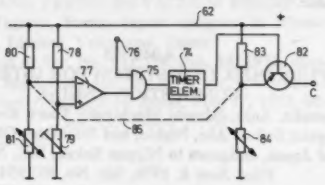
SYSTEM FOR REDUCING TOXIC COMPONENTS IN THE EXHAUST GAS OF AN INTERNAL COMBUSTION ENGINE

Bernd Kraus, Stuttgart, and Otto Glockler, Renningen, both of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Aug. 5, 1975, Ser. No. 601,991
Claims priority, application Germany, Aug. 6, 1974, 2437713
Int. Cl.[2] F02B *3/00;* **F02M** *39/00*
U.S. Cl. 123—179 L **8 Claims**

1. In an apparatus for reducing the concentration of toxic components in the exhaust gas of an internal combustion engine, which engine includes a fuel supply system, a fuel metering system, and a control pressure circuit for controlling said fuel metering system, said control pressure circuit including an electromagnetic valve, said apparatus including a regulating device for cyclic actuation of said electromagnetic valve, and an oxygen sensor located in the exhaust system of the engine and electrically connected to said regulating device, the improvement comprising:

a timing circuit, connected to said regulating device, for supplying a time-dependent control signal to said regulator device, said timing circuit including:



i. a threshold switch for receiving input signals and for generating an output signal;

ii. a logic gate, one of whose inputs is connected to the output of said threshold switch; and

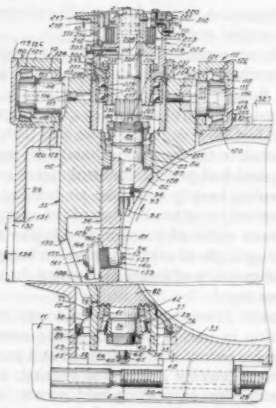
iii. a timer element, whose trigger input is connected to the output of said logic gate.

4,040,409

GRINDING WHEEL TRUING MECHANISM

Stanley John Walasewicz, Cavendish; Virgil William Erickson; Robert Adams Harrison, both of Springfield, and Royal Elwin Houghton, Ascutney, all of Vt., assignors to Bryant Grinder Corporation, Springfield, Vt.

Filed Dec. 19, 1975, Ser. No. 642,417
Int. Cl.[2] B24B *53/06*
U.S. Cl. 125—11 AS **4 Claims**



1. In a grinding wheel truing mechanism for dressing forms on the periphery of a grinding wheel, the combination comprising:

A. a support housing for mounting in a position adjacent a grinding wheel on which a form is to be imparted to the periphery of the grinding wheel;

B. a turn post carrier having one end pivotally mounted on said housing;

C. means for normally biasing the other end of said turn post carrier to an initial position;

D. a turn post rotatably mounted on said turn post carrier, said means for rotating said turn post includes:

1. a reversible power drive means mounted on said turn post carrier;

2. a drive system connecting said power drive means with

said turn post for rotating the turn post; said drive system includes:

a. a driven drum rotatably mounted on said turn post carrier and connected to said turn post;

b. means connecting said reversible power drive means to said driven drum for driving the same in a selected direction of rotation;

E. a main diamond mounted on said turn post for dressing form on the periphery of a grinding wheel;

F. means for rotating said turn post and swinging said turn post carrier from said initial position for advancing said main diamond from an initial position through a dressing path for dressing a form on the periphery of a grinding wheel, and for retracting the main diamond to said initial position, said means for swinging said turn post carrier includes:

1. a cam means for swinging said turn post carrier from said initial position to a second position after a dressing action through a first arcuate path by the main diamond for allowing the main diamond to dress a second arcuate path so as to form a Gothic Arch form on the periphery of a grinding wheel, said cam means for swinging said turn post carrier includes:

a. a fixed cam mounted on said turn post carrier;

b. an eccentric cam roller follower rotatably mounted on said support housing;

c. means for rotating said eccentric cam roller follower from a first position when the main diamond is moved through said first arcuate path to a second position when said main diamond is moved through said second arcuate path, said means for rotating said eccentric cam roller follower includes:

i. a toggle member for rotating said eccentric cam roller follower between said first and second positions; and,

ii. a pair of stop members mounted on the driven drum for moving the toggle member for rotating said eccentric cam roller follower.

4,040,410
THERMAL ENERGY STORAGE SYSTEMS EMPLOYING METAL HYDRIDES

George G. Libowitz, Brookside, N.J., assignor to Allied Chemical Corporation, Morris Township, N.J.

Continuation-in-part of Ser. No. 528,302, Nov. 29, 1974, abandoned. This application June 14, 1976, Ser. No. 695,678
Int. Cl.[2] F24J *3/02;* C01B *6/00*
U.S. Cl. 126—270 19 Claims

1. A reversible, closed thermal energy storage system for supplying heat to a living space comprising:

a. means for containing a material, said containing means exposed to an external source of heat, said material comprising at least one metal hydride capable of reversible dissociation into metal plus hydrogen gas and having a heat of formation of at least −5 kcal/mole, said external source of heat adapted to heat said material to a temperature sufficient to cause said dissociation of said material;

b. means for storing said hydrogen gas separate from said metal and apart from said living space;

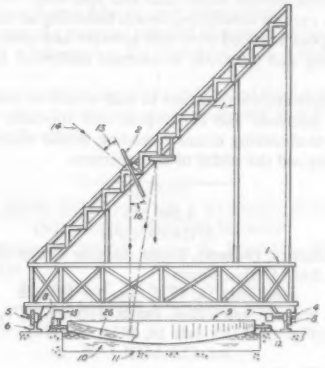
c. means for communicating between said containing means and said storing means; and

d. means for controllably recombining substantially all of said hydrogen gas with said metal in said containing means to regenerate substantially all of said metal hydride to produce heat, with additional means for transporting said produced heat to said living space.

4,040,411
APPARATUS FOR CONCENTRATION OF SOLAR RADIATION

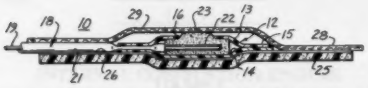
Rudolph Rust, 4562 Heil, Apt. 3, Huntington Beach, Calif. 92649

Filed Sept. 10, 1975, Ser. No. 612,106
Int. Cl.[2] F03G *7/02*
U.S. Cl. 126—271 3 Claims



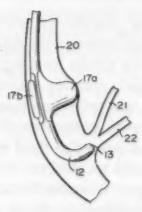
1. An apparatus for converting solar radiation into high temperature heat energy wherein the solar radiation is directed vertically downward by means forming reflecting planes onto the surface of a fluid body rotating at constant angular velocity about its vertical axis; said reflecting planes being located upon a rotating gantry centered on the axis of the rotating fluid such that the rays reflected from the fluid surface are directed to another reflecting means located on said gantry so as to concentrate said rays upon a radiation to enthalpy exchanger located near means forming the focal point of said other reflecting means and wherein the reflectivity of the fluid is increased by a covering or partial covering of reflective particulate floating material, said gantry including means to enable said gantry to follow the sun in azimuth and upon which are mounted pivoted reflecting planes including means to enable said pivoted reflecting planes to follow the suns radiation in elevation to maintain the angle of incidence of the suns rays upon said rotating fluid surface equal to the angle between said surface and the vertical, and wherein the means for rotating the fluid is a mechanism which includes means to form a vessel containing a volume of fluid and having support means for rotating said vessel means about its' vertical axis, a multiplicity of wheels pressed substantially uniformly against the circumference of said vessel means; one or more of said wheels being rotated by a constant speed motor thus causing said vessel to rotate at constant revolutions per minute wherein said vessel support means is a fluid in a stationary tank, said fluid having a sufficient depth and density to float the rotating vessel means with its contents.

4,040,412
BIOELECTRODES
Takuya R. Sato, 5130 Randall St., Culver City, Calif. 90230
Continuation-in-part of Ser. No. 495,957, Aug. 9, 1974, abandoned, which is a continuation-in-part of Ser. No. 228,827, Feb. 24, 1972, Pat. No. 3,834,373. This application Feb. 3, 1976, Ser. No. 655,030
Int. Cl.[2] A61B 5/04
U.S. Cl. 128—2.06 E 72 Claims



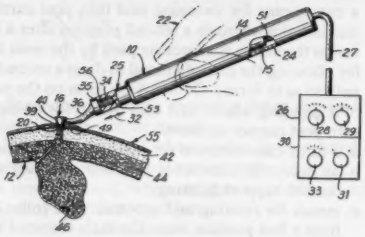
1. A bioelectrode applicable to a body part, comprising in combination:
a pouch having a solid bottom formed of a sheet of electrically insulating watertight material being solid throughout said bottom, and a top sealed to said bottom and having an aperture remote from said bottom, said pouch defining an enclosed interior wider than said aperture;
electric current conducting means including an electrode in said pouch spaced from said aperture and means for connecting said electrode to external electronic equipment; and
electrolyte-absorbing means in said pouch in contact with said electrode and exposed at said aperture, said electrolyte-absorbing means extending in said enclosed interior beyond the width of said aperture.

4,040,413
ENDOSCOPE
Susumu Ohshiro, Iwatsuki, Japan, assignor to Fuji Photo Optical Co. Ltd., Omiya, Japan
Filed July 14, 1975, Ser. No. 595,425
Claims priority, application Japan, July 18, 1974, 49-81739; July 18, 1974, 49-81740; July 18, 1974, 49-81741
Int. Cl.[2] A61B 1/06
U.S. Cl. 128—6 6 Claims



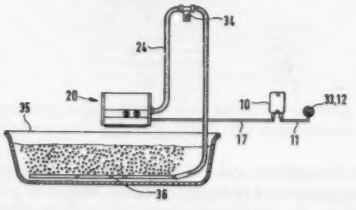
1. An endoscope for visual internal examination of body cavities comprising:
a light transmitting tube including a fiber optical light transmitting bundle having an image receiving end and an image output end, a sleeve extending around and along the light transmitting bundle concentrically therewith for enclosing the bundle for protection thereof and facilitating the insertion thereof into body cavities, and an image taking head connected with the image receiving side end of the sleeve having therein an optical system for focusing an image of the internal view of the body cavities on the image receiving end of the light transmitting bundle,
a plurality of inflatable balloons provided on the outer face of said sleeve so as to be inflated radially outwardly in different directions, said balloons being selectively and independently inflated,
said sleeve being flexible between said image taking head and said balloons,
a plurality of air ducts communicated with said balloons and extending along the sleeve on the internal surface thereof from the balloon to the output end of the sleeve, and
air supply source means connected with said plurality of air ducts for independently supplying air into said balloons to inflate said balloons independently of each other.

4,040,414
ULTRASONIC PERSONAL CARE INSTRUMENT AND METHOD
Leonard W. Suroff, Jericho, N.Y., assignor to Xygiene, Inc., Panama, Panama
Filed May 12, 1976, Ser. No. 685,518
Int. Cl.[2] A61H 1/00
U.S. Cl. 128—24 A 79 Claims



1. The method of removing a foreign deposit from the tissue of a human comprising the steps of:
A. positioning adjacent said foreign deposit to be removed a surface capable of supporting and transmitting ultrasonic vibrations,
B. supplying a fluid to the tissue adjacent said foreign deposit for engagement by said surface,
C. inducing vibrations in said surface at a frequency in the ultrasonic range,
D. moving said ultrasonically vibrating surface relative to said foreign deposit such that it substantially engages the tissue and applies a force thereto, whereby an extraction of said foreign deposit from its containment in said tissue is obtained, and
E. circumferentially applying a static force to the tissue in surrounding relation to said foreign deposit.

4,040,415
AIR BUBBLING MASSAGING APPARATUS
Ruth Kulisch, Schwalbenstrasse 5, D-2902 Rastede, Germany
Filed Dec. 19, 1975, Ser. No. 642,381
Claims priority, application Germany, Dec. 24, 1974, 2461475
Int. Cl.[2] A61H 9/00
U.S. Cl. 128—66 9 Claims



1. In hydrotherapy apparatus including a housing within which there is positioned at least a blower means for supplying heated air to said blower and control means for said blower and heated air supply means, a hose communicating at one end thereof with said blower and at the other end thereof with means positionable within a bathtub so as to introduce the heated air thereinto, the improvement comprising in combina-

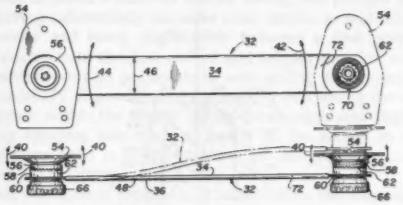
tion a second housing independent of and remote from the blower-containing housing, a step down electrical transformer having an output not greater than 24 volts positioned in said housing and having an input connected to a source of line current, and an elongated low voltage cable connecting the output of said transformer to said blower and heated air supply means and said control means therefor.

4,040,416

ORTHOPEDIC SPLINT

Leo Zentman, c/o Orthopedic Splints, Inc. 147 Albany Ave., Lindenhurst, N.Y. 11757

Filed July 23, 1976, Ser. No. 708,043
Int. Cl.[2] A61F *3/00*
U.S. Cl. 128—80 A **1 Claim**



1. In an improved orthopedic splint comprising a pair of shoe-engaging plates for attachment to the shoes of a patient using said splint, spaced apart rotation axis-defining means for rotatably mounting each said shoe-engaging plate preparatory to urging each said shoe-engaging plate through a rotatable traverse about one said cooperating rotation axis incident to fixing said shoe-engaging plates in a selected angular relation to each other, and a flat, normally horizontally disposed planar connecting member of metallic leaf spring construction material flexible up and down from said horizontal plane and connected in spanning relation between said spaced apart rotation axis-defining means for allowing limited movement of said shoe-engaging plates and the patient's feet only in rocking movement relative to each other up and down from the horizontal plane as limited by the planar member, said rocking movement being permitted by the flexuring of said member up and down out of its normally horizontal plane while preventing any rotative movement about either of said rotation axes of said shoe-engaging plates to retain said plates and the patient's feet in their fixed selected angular relationship to each other so that the patient can partake of exercise movements in the up and down directions, but not rotatively during use of said orthopedic splint.

4,040,417

INTRAUTERINE DEVICE

Jaime A. Zipper, Santiago, Chile, assignor to G. D. Searle & Co., Chicago, Ill.

Division of Ser. No. 94,216, Dec. 1, 1970, Pat. No. 3,803,308, which is a continuation-in-part of Ser. No. 760,688, Sept. 18, 1968, Pat. No. 3,563,235. This application Dec. 12, 1973, Ser. No. 424,100
Int. Cl.[2] A61F *5/46*
U.S. Cl. 128—130 **3 Claims**

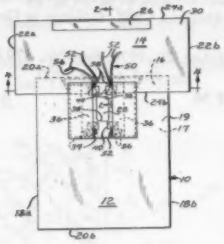
1. An intrauterine device adaptable to insertion in the uterine cavity and capable of being retained therein for a prolonged period of time, said device including a contraceptively effective amount of non-toxic copper or zinc compound.

4,040,418

SURGICAL DRAPE WITH RETAINING MEANS

Robert F. Collins, Barrington, Ill., assignor to The Kendall Company, Boston, Mass.

Filed Apr. 12, 1976, Ser. No. 676,029
Int. Cl.[2] A61B *19/06*
U.S. Cl. 128—132 D **13 Claims**



1. A surgical drape for use in association with auxiliary equipment, such as a tube or cord, comprising:

sheet means of a material resistant to passage of bacteria and having a fenestration for placement over a surgical site; and

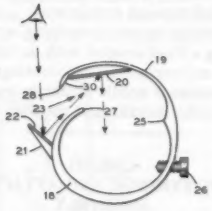
tie means secured to the drape and spaced from a side of the fenestration for retaining said equipment at a fixed location on the drape.

4,040,419

SHIELDING HOLDER FOR A SYRINGE HAVING INDIRECT VIEWING MEANS

Abraham Goldman, 105-54 Avenue K, Brooklyn, New York, N.Y. 11236

Filed Feb. 2, 1976, Ser. No. 654,191
Int. Cl.[2] G21F *5/00*; A61N *5/00*
U.S. Cl. 128—215 **4 Claims**



1. A shielding holder for a syringe comprising a holder of high density material, said holder including an open ended arcuate lower portion adapted to receive a syringe therein and having a free lower leading edge, an upper portion integral with said free lower leading edge, said upper portion generally following the arcuate curvature of the arcuate lower portion and overlying the syringe receiving lower portion in upwardly spaced relation thereto, said upper portion extending past and terminating beyond said lower leading edge in an upper leading edge oriented generally parallel to said lower leading edge and in upwardly spaced relation thereto, said leading edges defining an opening therebetween, the orientation of said leading edges relative to each other precluding a direct passage of radiation from a lower portion received syringe through the edge defined opening, and mirror means for viewing a lower portion received syringe through the opening from the exterior of said holder, said mirror means comprising a first mirror positioned within said upper portion generally above said opening for a viewing thereof through said opening, said first mirror facing toward the lower portion, a second mirror and

means mounting said second mirror on the exterior of said lower portion below said opening with said second mirror facing said first mirror through said opening for an indirect viewing of a lower portion received syringe by a user looking in said second mirror.

4,040,420

PACKAGING AND DISPENSING KIT

Spencer J. Speer, Ontario, Calif., assignor to General Dynamics, Pomona, Calif.

Filed Apr. 22, 1976, Ser. No. 679,426
Int. Cl.[2] A61M 5/00
U.S. Cl. 128—218 M **18 Claims**

1. Apparatus for storing and dispensing a plurality of disparate inter-reactable fluids from separate storage locations, comprising:

a plurality of distinct, elongate chambers containing fluids, each chamber including a piston for forceably ejecting the fluid therefrom through a tapered nozzle;

needle means having a corresponding plurality of interior conduits for dispensing fluid from said nozzles;

lock means including a ridge projecting about an exterior surface of each tapered nozzle; and

releasable retaining means comprising a separable needle block having a fluid conduit with an interior groove for engaging a corresponding nozzle ridge and means for retaining associated needle means in sealing relationship with the chamber nozzles and the fluid conduits.

4,040,421

HYPODERMIC SYRINGE AND ATTACHED NEEDLE ASSEMBLY

H. Theodore Young, Union, N.J., assignor to Becton, Dickinson and Company, Rutherford, N.J.

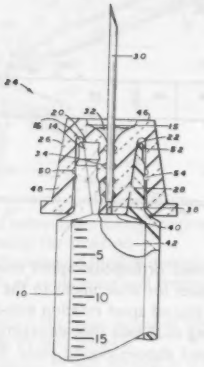
Continuation-in-part of Ser. No. 565,048, April 4, 1975, abandoned. This application July 6, 1976, Ser. No. 702,914
Int. Cl.[2] A61M 5/00
U.S. Cl. 128—218 N **1 Claim**

1. A low-dose hypodermic syringe and attached needle assembly wherein:

the syringe includes a plastic tubular barrel having a distal end and a proximal end, a reduced boss having an exterior face extending from the distal end and defining an inner end wall, a piston in the barrel having a plunger rod extending from the proximal end of the barrel and the piston adapted to travel in the barrel into engagement with the barrel inner end wall in dispensing liquid from the syringe into the needle assembly;

the needle assembly includes a needle having a lumen and a pointed distal end and a proximal end and a plastic hub secured by cement to the needle at its proximal end, the hub including a radial flange and a tubular collar having one end integral with the flange and its other end extending towards the needle proximal end, the collar adapted to be manually gripped for attaching and removing the needle assembly from the barrel; and

a connection joint attaching the needle assembly to the hypodermic syringe for cooperating in permitting fluid to be conveyed through the lumen from the fluid chamber to the pointed end of the needle comprising a female conical opening in the reduced boss, a conical male extension on the proximal end of the said hub and being inserted in the female opening, the shape and dimensions of the male extension matching the female opening whereby when the said extension is inserted into the said opening a leak proof seal will be provided by the matching surfaces of the female opening and male extension and the proximal end of such extension will be flush with the inner end wall of the barrel, the proximal end of the lumen substantially



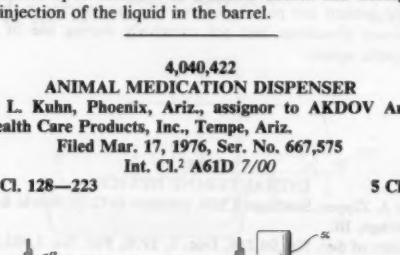
coincident with the proximal end of the extension so that there will be no residual volume of liquid beyond the measured volume of the barrel when the piston is extended fully into the barrel against the inner end wall; the collar having an annular radially inwardly extending bead for frictionally engaging with the outer surface of the reduced boss to provide a mechanical lock of the needle assembly on the syringe barrel, the collar having an inner face between the bead and flange providing an interference fit with the associated exterior surfaces of the reduced boss, the bead forming in time a corresponding depression in the boss outer surface thereby preventing the needle assembly from disassociation with the syringe barrel upon removal of a needle sheath and during the injection of the liquid in the barrel.

4,040,422

ANIMAL MEDICATION DISPENSER

Burt L. Kuhn, Phoenix, Ariz., assignor to AKDOV Animal Health Care Products, Inc., Tempe, Ariz.

Filed Mar. 17, 1976, Ser. No. 667,575
Int. Cl.[2] A61D 7/00
U.S. Cl. 128—223 **5 Claims**



1. In combination, a drenching bit coupled to a bridle

adapted to be attached to the head of an animal for positively and completely injecting a metered amount of a substance into the oral cavity of the animal at a controlled rate, said bit comprising:

a. a straight hollow tubular member having a tubular cavity having a substantially uniform cross section, a first end located in a first end portion, and a second end, said tubular member being positionable within the oral cavity of the animal and having sufficient length for the first end portion to be located outside said oral cavity;

b. a dispensing aperture disposed at a location in said tubular member intermediate the first and second ends;

c. end means for sealing off the tubular cavity of said tubular member at a position immediately adjacent said aperture;

d. passageway means located in said first end portion of said tubular member communicating with the tubular cavity for introducing the substance into the tubular cavity of said tubular member; and

e. plunger means having a plunger head including a working face disposed within the tubular cavity, said plunger head having substantially the same cross section as said tubular cavity and being displaceable between a first position proximate to the first end of said tubular member and a second position proximate to said sealing end means for forcefully dispensing and completely evacuating the substance within the tubular cavity out through said dispensing aperture into the oral cavity of the animal as said plunger head is displaced from the first position to the second position;

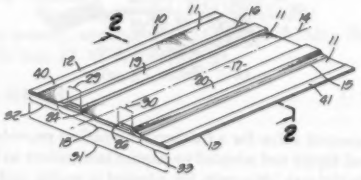
f. said passageway means being intermediate said dispensing aperture and said working face when said plunger head is in said first position.

4,040,423

URINE TRAP DIAPER

John Leslie Jones, Sr., 1070 Glen Oaks Blvd., Pasadena, Calif. 91105

Filed July 23, 1976, Ser. No. 706,761
Int. Cl.[2] A61F *13/16, 13/18*
U.S. Cl. 128—287 **12 Claims**



1. An infant diaper having a rectangular, coplanar multiple ply, marginally aligned fluid absorbent paper sheet pad area, said pad area having a pair of longitudinal diaper pad exterior margins oppositely disposed to each other, a central longitudinal diaper pad axis, and a diaper total pad width axis normal to said longitudinal diaper pad axis, wherein the improvement combination cmprises:

a fluid absorbent paper sheet pad area having each one of two longitudinal pad margins coincident with one longitudinal diaper pad margin, said pad area having the required thickness;

a pair of narrow pad pleats oppositely disposed in parrallel along the full longitudinal diaper axis length, each one of said pair of pad pleats formed on a first face of said paper pad area a spaced distance apart, said pair of pleats and the spaced pad area between said pleats together providing an excreta channel pad area, and the diaper total pad width axis value having the value of the second face width of said absorbent pad area excluding the side width values of the pair of narrow pleats;

a thin, flexible, fluid impermeable membrane disposed adjacently coextensive with the diaper total pad width value, said second face of said absorbent pad area opposite said pad first face, said membrane also forming each one of a pair of opposed longitudinal border seals disposed on said pair of longitudinal diaper pad margins, said seals securing said diaper pad margins.

4,040,424

SURGICAL PAD

James R. Hunt, Carencro, La., assignor to Will Ross, Inc., Milwaukee, Wis.

Filed May 14, 1976, Ser. No. 686,343
Int. Cl.[2] A61F *13/16*
U.S. Cl. 128—290 R **8 Claims**

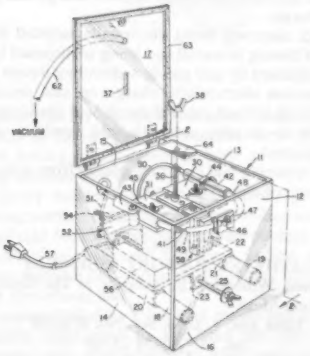
1. A surgical pad comprising a backing sheet, an absorbent pad secured to said sheet at substantially the midportion thereof, said sheet extending beyond said pad to form two end portions, and a pressure-sensitive, adhesive strip applied to one of said end portions in a T-shaped configuration, such that the horizontal portion of the T extends along the edge of said end portion and the vertical portion of the T extends between the end of said end portion and the end of said pad.

4,040,425

POULTRY BEAK REMOVER

John S. Goodling; Gayner R. McDaniel, both of Auburn, Ala., and Richard A. Steadham, Texas City, Tex., assignors to Auburn Research Foundation, Auburn, Ala.

Filed Jan. 6, 1976, Ser. No. 646,924
Int. Cl.[2] A61B *17/36;* **A61N** *3/00*
U.S. Cl. 128—303.14 **13 Claims**



1. A poultry beak remover for debeaking fowl, comprising: a housing having a beak receiving aperture therein of a size to receive the beak of a fowl, for insertion of the beak of a fowl into the housing; a pair of spaced apart electrodes supported in the housing in substantial alignment with the aperture and spaced therefrom a distance such that when the beak is inserted through the aperture, a portion thereof extends between the electrodes; and electrical circuit means connected with the electrodes for discharging a spark across the electrodes to burn

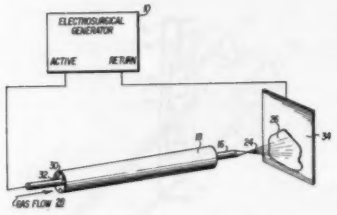
the beak of the fowl received therebetween and thus effect removal of a desired portion of the beak.

4,040,426

ELECTROSURGICAL METHOD AND APPARATUS FOR INITIATING AN ELECTRICAL DISCHARGE IN AN INERT GAS FLOW

Charles F. Morrison, Jr., Boulder, Colo., assignor to Valleylab, Inc., Boulder, Colo.

Filed Jan. 16, 1976, Ser. No. 649,682
Int. Cl.[2] A61B *17/36*
U.S. Cl. 128—303.17 **21 Claims**



1. Apparatus for establishing an electrical discharge to an object comprising

a support;

a source of electrical energy;

an active electrode connected to said source of electrical energy and being supported by said support and outwardly extending therefrom;

a source of inert gas;

gas flow directing means connected to said source of inert gas for directing the gas past said electrode to thereby facilitate the establishment of a primary electrical discharge in the gas disposed adjacent the end of the electrode and extending outwardly therefrom;

discharge initiating means disposed adjacent to said electrode for initiating said electrical discharge in said gas formed adjacent the end of the electrode, said discharge initiating means including said active electrode and a second electrode having a small gap therebetween, across which an auxiliary discharge initiates said primary electrical discharge;

said second electrode being electrically isolated from any source of biasing potential and being so disposed in the gas flow established by said gas flow directing means that said gas generates electrostatic charge on said second electrode, which is discharged through said gas to said active electrode to thereby establish said auxiliary electrical discharge; and

means for returning said electrical energy from said object to said source of electrical energy.

4,040,427

CATHETER SUPPORT ASSEMBLY

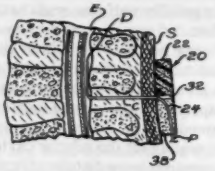
Alon P. Winnie, Wilmette, Ill., assignor to The Kendall Company, Boston, Mass.

Filed Apr. 1, 1976, Ser. No. 672,590
Int. Cl.[2] A61M *25/02*
U.S. Cl. 128—348 **4 Claims**

1. A catheter support assembly, comprising:

a catheter having a distal end for placement in a patient's body, and a proximal end portion extending outside the patient's body when the catheter is placed;

a support member of relatively soft and compressible foam material and having an inner surface for facing the patient's body, an outer surface facing away from the patient's body, and a slot extending between said inner and outer surfaces and extending between an outer edge of the support member toward a central portion of the support member, a pressure-sensitive adhesive on said inner surface, and a release sheet releasably covering said adhesive, said support member being secured to the patient's body by said adhesive with said proximal end portion of the



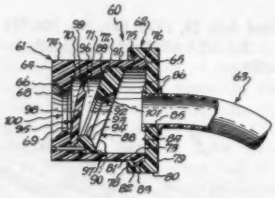
catheter located in said slot, said support member having a sufficient thickness between said inner and outer surfaces to cushion the patient's body and prevent kinking of the catheter when the patient reclines on the support member.

4,040,428

CONTROL VALVES FOR TRACHEOTOMY PATIENT OR LARYNGEAL PROSTHESIS

Earl W. Clifford, Getzville, N.Y., assignor to The Aro Corporation, Bryan, Ohio

Filed Aug. 30, 1976, Ser. No. 718,946
Int. Cl.[2] A61M *25/00*; A61F *1/20*; A61M *16/00*
U.S. Cl. 128—351 **3 Claims**



1. A control valve for a tracheotomy patient provided with a tracheal fistula and adapted to require said patient to breathe normally through his mouth, but adapted to enable said patient to breathe heavily through said tracheal fistula, comprising:

a housing defining a chamber therewithin, said housing provided with a first control opening communicating said chamber with ambient atmosphere and provided with a second control opening adapted to communicate said chamber with said tracheal fistula, a marginal portion of said housing about each of said control openings defining a seat facing the other of said control openings; and

a flapper mounted on said housing in said chamber for movement between said control openings and having a flexible peripheral marginal portion, said flapper being adapted to move toward and sealingly assume the contour of the seat about said first control opening to close said first control opening when said patient normally exhales, said flapper also being adapted to move toward and sealingly assume the contour of the seat about said second control opening to close said second control opening when said patient normally inhales;

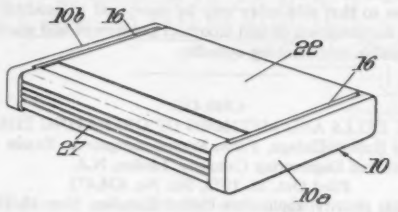
whereby said patient may be forced to breathe normally through his mouth but may breathe heavily through said tracheal fistula.

4,040,429

AUTOMATIC APPARATUS FOR MAKING ROLLED CIGARETTES

Jean R. Lacroix, 167 bis, Avenue Victor Hugo, 75116 - Paris, France

Filed Sept. 15, 1975, Ser. No. 613,540
Claims priority, application France, Nov. 4, 1974, 74.36611
Int. Cl.[2] A24C *1/10, 5/08*
U.S. Cl. 131—51 8 Claims



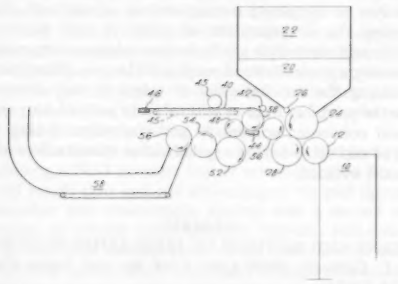
1. A device for making rolled cigarettes comprising a housing containing a bearing plate and a bearing shaft, said plate extending in a plane substantially parallel to a base of said housing, an endless belt passing around said plate and said shaft whereby slack in said belt forms a groove between said plate and said shaft for receiving tobacco, means mounting at least one of said plate and said shaft for relative movement to open and substantially close said groove, said bearing plate having a major surface serving as a support for said belt in a manually accessible position whereby, when said groove is substantially closed, a piece of sheet material can be introduced into the groove and an operator can manually move the belt along said major surface relative to the plate and hence around said shaft to roll the tobacco within the sheet material.

4,040,430

METHOD AND APPARATUS FOR MAKING FILTER CIGARETTES

Desmond Walter Molins, London, England, assignor to Molins Limited, England

Filed May 18, 1976, Ser. No. 687,744
Claims priority, application United Kingdom, May 20, 1975, 21365/75; Aug. 22, 1975, 34888/75
Int. Cl.[2] A24C *5/58*
U.S. Cl. 131—94 17 Claims



1. A method of making filter cigarettes comprising assembling tobacco sections moving in a direction transverse to their lengths along two separate paths, the tobacco sections on one path being parallel to and transversely displaced relative to the tobacco sections on the other path; assembling filter portions moving in a direction transverse to their lengths along two separate paths, the filter portions on one path being parallel to and transversely displaced relative to the filter portions on the other path; moving said tobacco sections said filter portions along portions of said separate paths which are partially common, so as to produce two rows of transversely-moving tobacco sections having axially adjacent filter portions, the filter portions being at the same ends of the tobacco sections in each row in relation to the direction of movement of the rows; and uniting the axially adjacent filter portions and tobacco sections whilst they are moving transverse to their lengths.

4,040,431

METHOD OF INCREASING THE FILLING CAPACITY OF SHREDDED TOBACCO TISSUE

James G. Ashworth; Eugene Glock; James G. Kelly, all of Richmond; James L. McLaughlin, Chester, and Owen T. Merwin, Richmond, all of Va., assignors to American Brands, Inc., New York, N.Y.

Filed Sept. 5, 1975, Ser. No. 610,736
Int. Cl.[2] A24B *3/18*
U.S. Cl. 131—140 P 6 Claims

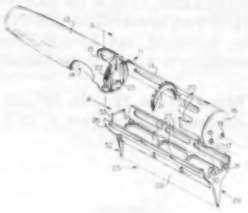
1. The process of increasing the filling capacity of shredded tobacco comprising the steps of first conditioning the tobacco so that its temperature is at least about 130° F. to 250° F. and its moisture content from about 15% to 35% promptly followed by drying the thus conditioned tobacco with a hot gas while the tobacco is in the form of a substantially thin laminar dispersion in the gas at a temperature such that the moisture content of the tobacco will be lowered within about 5 seconds to a moisture content of about 11% to 16%.

4,040,432

HAIR STYLING TOOL

Rocco J. Adinolfi, Burlington, Mass., assignor to The Gillette Company, Boston, Mass.

Filed Apr. 1, 1976, Ser. No. 672,745
Int. Cl.[2] A45D *1/00*
U.S. Cl. 132—9 4 Claims



1. Portable hair styling apparatus comprising:

a plurality of hair styling attachments, each of said attachments having a first detent member at a first end and a prong member at a second end;

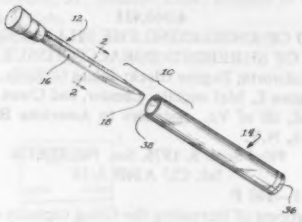
an integrally molded tool having a handle portion and a working portion extending in opposite directions along an axis of said tool wherein said handle portion is generally cylindrical in shape and defines a hollow portion and further includes first and second gripping means disposed about its surface; and

mating means including a latching means and a stop means integrally connected to said tool for interchangeably mounting said attachments to said tool, said latching means including a second movable detent member for mating with said first detent member of each of said attachments and further including an integrally molded tab portion positioned in said hollow portion of said handle portion proximate said first and second gripping means for moving said second detent member of said latching means in a general clockwise direction when pressed by the user of said tool and said stop means formed at an outer end of said working portion including an aperture means for receiving said prong member of each of said attachments.

4,040,433
TOOTHPICK AND CONTAINER ASSEMBLY

Robert G. Edison, 3032 University Ave., Highland Park, Ill. 60035

Filed Feb. 6, 1976, Ser. No. 655,917
Int. Cl.[2] A61C *15/00*
U.S. Cl. 132—89 5 Claims

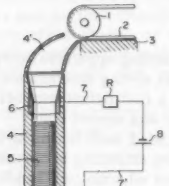


1. A reusable toothpick-and-container assembly comprising: elongated, tubularly-shaped and transparent container means for holding a liquid, said container means being closed at one end and having an open mouth at the other end which is adapted to be sealed so as to provide a fluid-tight container; and molded plastic toothpick means which includes an elongated blade-shaped portion having a V-shaped cross-section and terminating at one end in a tip for picking debris from between a user's teeth, and end cap means cooperatively associated with the other end of the blade-shaped portion for grasping by the user and adapted to sealingly cooperate with said open mouth to provide said seal, said toothpick adapted to be stored within said container and in contact with a liquid therein for cleansing said toothpick for reuse.

4,040,434
DEVICE FOR DETECTING STACK OF COINS FOR USE IN COINS-PACKAGING MACHINE

Kenkichi Watanabe, Kawasaki, and Kyoichi Ohsako, Tokyo, both of Japan, assignors to Laurel Bank Machine Co., Ltd., Tokyo, Japan

Filed May 17, 1976, Ser. No. 687,224
Claims priority, application Japan, June 6, 1975, 50-68309
Int. Cl.[2] G07D *9/00*
U.S. Cl. 133—1 A 5 Claims

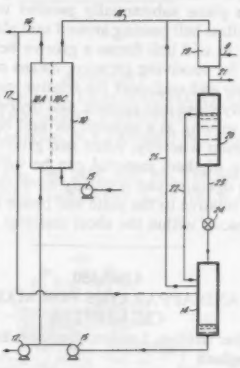


1. A device for detecting a stack of coins for use in a coin-packaging machine adapted to form a stack of a predetermined number of coins in which each coin be horizontally positioned in face to face relation with the next one and then to package said each stack with wrapping material, said device comprising a stacking cylinder of electrically insulating material adapted to receive coins supplied from the upper inlet to form a stack of a predetermined number of coins therewithin, a bottom plate of electrically conductive material adapted to be moved between open and closed positions for discharging said stack of coins through the lower open end of said stacking cylinder into the subsequent stage of the packaging machine while in the open position and for supporting said stack of coins formed within said stacking cylinder from the lower end thereof, an electrode of a ring-like shape which forms part of the inner surface of said stacking cylinder at a height of a little more distance than the height of said stack of coins from the lower end thereof, a relay and an electric power source electrically connected together in series relation between said electrode and said bottom plate, whereby, when at least one coin is incorrectly positioned in said stacking cylinder and the height of said stack increases to get contact with said electrode, electric current is caused to pass through said relay via said stack of coins so that said relay may be energized to produce an output for detection of said incorrect position of said stack of coins within said stacking cylinder.

4,040,435
FUEL CELLS AND METHODS OF OPERATING THEM

Eugene Robert Elzinga, Paris, France, assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed Oct. 28, 1975, Ser. No. 626,472
Claims priority, application United Kingdom, Nov. 18, 1974, 49763/74
Int. Cl.[2] H01M *8/04*
U.S. Cl. 429—14 9 Claims



1. A method of operating a fuel cell of the type which employs an electrolyte having a solvent and a solute dissolved therein so as to permit increase in electrolyte temperature during start-up of said cell and so as to avoid crystallization of said solute when electrolyte temperature is decreased during shut-down of said cell comprising: allowing the solvent in said electrolyte to evaporate during start-up of said cell, therey increasing the concentration of solute in said electrolyte, whereby said electrolyte can be heated to higher temperatures; condensing a predetermined portion of the evaporated solvent; maintaining the concentration of solute in said electrolyte below the solubility limit of said solute in said solvent; returning said condensed solvent to said electrolyte during shut-down of said cell whereby crystallization of said solute in said solvent is avoided.

4,040,436
MEANS AND METHOD OF IRRIGATION CONTROL

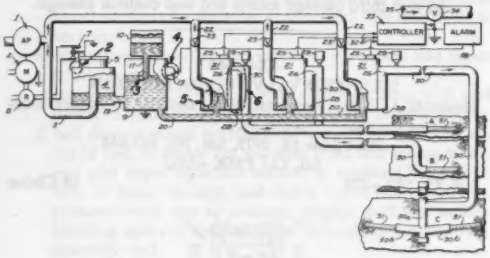
Dave L. Caldwell, 28890 Lilac Road, Sp. 110, Valley Center, Calif. 92082

Filed Aug. 8, 1975, Ser. No. 603,081
Int. Cl.[2] A01G *25/00*
U.S. Cl. 137—1 27 Claims

1. A means for indicating soil moisture condition, comprising:

a. a sensor having a porous wall adapted when in moisture contact with soil to maintain a moisture content corresponding approximately to the moisture content of the soil;

b. a gas line connected to the sensor;
c. means for maintaining the gas in the gas line and sensor at a pressure to cause an increased seepage of gas through



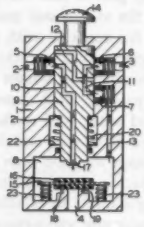
the sensor wall as the water content of the sensor wall and soil is lowered;
d. and means for measuring the seepage rate of the gas through the sensor to indicate the soil moisture condition.

4,040,437

AUTOMATIC FLUID PRESSURE CUT-OFF SAFETY DEVICE

Helmut Gottling, Oberweser, Germany, assignor to WABCO Westinghouse GmbH, Hannover, Germany

Filed May 25, 1976, Ser. No. 689,940
Claims priority, application Germany, June 4, 1975, 2524781
Int. Cl.[2] G05D 7/00
U.S. Cl. 137—102 **8 Claims**



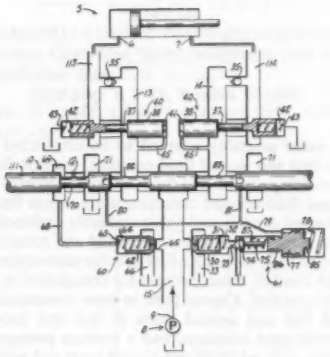
1. A fluid pressure cut-off safety device interposable in a fluid pressure supply pipe via which operating fluid at a predetermined operating pressure may be supplied to a fluid pressure operable device, said safety device comprising:
a. a casing having formed therein a fluid pressure supply port normally supplied with operating fluid at a certain predetermined pressure, a fluid pressure delivery port via which operating fluid pressure is deliverable to the fluid pressure operable device, an exhaust port open to atmosphere, and a fluid pressure operating chamber;
b. first valve means in said casing effective in one position for opening a fluid pressure supply communication between said supply port and said delivery port via said operating chamber and concurrently closing with a second valve means an exhaust communication between said delivery port and said exhaust port, or for alternatively closing with said second valve means said supply communication and concurrently opening said exhaust communication via said operating chamber;
c. said first valve means being operable to a different position in which both said supply and exhaust communications are concurrently closed;
d. said second valve means operable responsively to fluid in said operating chamber, at said certain pressure or greater, to a first position in which, and cooperatively with said first valve means in its said one position, said supply communication is open and said exhaust communication is concurrently closed;
e. said second valve means being operable, in response to a reduction of fluid pressure in said operating chamber to a pressure less than said certain pressure, to a second position in which, and cooperatively with said first valve means in its said one position, said supply communication is closed and said exhaust communication is concurrently open;
f. operating means carried by said first valve means and yieldable to manual force effecting concurrent operation of said first valve means and said second valve means to said different and said first positions, respectively, in which positions said first and said second valve means are cooperatively effective for closing both said supply and exhaust communications; and
g. biasing means for restoring said first valve means to its said one position upon release of said manual force subsequently to restoration of fluid pressure in said operating chamber to said certain pressure or greater for retaining said second valve means in its said first position.

4,040,438

CONTROL VALVE WITH FLOW CONTROL MEANS

Raud A. Wilke, Brookfield, Wis., assignor to Koehring, Milwaukee, Wis.

Division of Ser. No. 462,038, April 18, 1974, Pat. No. 3,951,162, which is a continuation-in-part of Ser. No. 195,145, Nov. 3, 1971, abandoned. This application Jan. 30, 1976, Ser. No. 653,824
Int. Cl.[2] F15B 11/08
U.S. Cl. 137—106 **5 Claims**



1. In combination:
A. a control valve having a valve element movable from a neutral position to an operating position at which it directs pressure fluid from a supply passage to one of a pair of service passages while directing exhaust fluid in the other service passage to a tank passage;
B. a flow control valve for said other service passage operable to prevent rise in pressure of exhaust fluid therein above a predetermined value;
C. a tank port which is connectible with said supply passage;
D. a valve mechanism having a valve member which can be opened by supply fluid pressure to communicate the supply passage with said tank port except at times when a venting passage for a chamber in which the valve member operates is closed;
E. and means controlling the effectiveness of said venting passage comprising
1. a pilot valve which can be opened under the action of supply fluid pressure thereon,
2. a spring to normally hold the pilot-valve in a position closing said venting passage,
3. a cylinder having a piston therein providing a seat for said spring,
4. a spring member acting upon the piston in a direction to yieldingly maintain the same in a position at which it

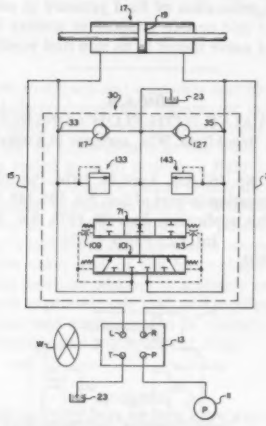
loads the pilot valve spring and thereby holds the pilot valve in position closing said venting passage,

5. and means for moving the piston in the opposite direction to relax the pilot valve spring in consequence of pressure in said other service passage in excess of said predetermined value.

4,040,439
CUSHION VALVE ARRANGEMENT

Sohan Uppal, St. Louis Park, Minn., assignor to Eaton Corporation, Cleveland, Ohio

Filed Mar. 29, 1976, Ser. No. 671,480
Int. Cl.[2] F15B *15/18*
U.S. Cl. 137—115 16 Claims



1. A valve assembly adapted to be connected in parallel between first and second fluid conduits, the first fluid conduit communicating pressurized fluid to a fluid actuated device and the second fluid conduit communicating return fluid from the fluid actuated device, said valve assembly cushioning the rate of pressure rise of the pressurized fluid and comprising:

a. a valve body defining a first port for connection to the first fluid conduit, a second port for connection to the second fluid conduit, a spool bore in open communication with said first and second ports at first and second axially spaced-apart locations, and a cushion passage communicating with said first and second ports and with said spool bore at a third location disposed axially between said first and second locations;

b. a valve spool slidably disposed within said spool bore and having a central position therein, said valve spool defining an axial bore, first and second passage means communicating between said axial bore and said first and second ports, respectively, and third passage means communicating between said axial bore and said cushion passage when said valve spool is in said central position;

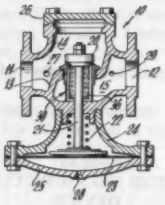
c. a valve piston slidably disposed within said axial bore and biased toward a neutral position blocking fluid communication between said axial bore and said third passage means when said first and second ports are subjected to less than a minimal pressure differential, said valve piston being movable to a second position, relative to said valve spool, permitting fluid from said first port to flow to said cushion passage, then to said second port when fluid pressure in said first port exceeds fluid pressure in said second port by at least said minimal pressure differential;

d. said valve spool, said valve body and said spool bore defining first and second dashpots and first and second orifices, said first orifice communicating between said first passage means and said first dashpot, said second orifice communicating between said second passage means and said second dashpot, an increase in fluid pressure in said first port causing an increase in pressure in said first dashpot, moving said valve spool in a direction to cause fluid to flow from said second dashpot to said second passage means, gradually reducing to zero the flow area defined by said third passage means and said cushion passage.

4,040,440
SILENCED VALVE CONSTRUCTION

Moustafa A. Zaki, Newburgh, N.Y., assignor to Spence Engineering Company, Walden, N.Y.

Filed June 18, 1975, Ser. No. 587,845
Int. Cl.[2] F16K *47/02*
U.S. Cl. 137—375 19 Claims

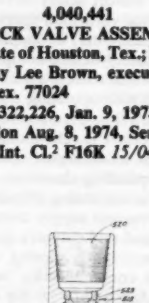


1. In a valve, a valve body having inlet and outlet ports, a circular valve seat carried by said body between said ports and having an inner wall defining the outer confines of an axially extending annular passage on the downstream side of said seat for accommodation of valve-controlled fluid flow from the inlet port to the outlet port of said valve, a valve stem guided for reciprocation on the axis of said passage, a valve member carried by said stem for coaction with said seat, and an elongate cylindrical sound-absorbent structure on the downstream side of said valve member and within and spaced from said inner wall of said passage, said sound-absorbent structure including a perforated outer wall surface in radially opposed spaced relation to said inner wall and defining with said inner wall said annular passage for fluid flow downstream from said valve member, the spacing of said perforated wall surface from said inner wall being such as to establish a flow area in said passage of at least maximum valve-open effective area.

4,040,441
CHECK VALVE ASSEMBLY

Cicero C. deceased, late of Houston, Tex.; by Joe Russell Brown, executor; by Ramey Lee Brown, executor, both of P.O. Box 19236, Houston, Tex. 77024

Division of Ser. No. 322,226, Jan. 9, 1973, Pat. No. 3,850,191.
This application Aug. 8, 1974, Ser. No. 495,901
Int. Cl.[2] F16K *15/04*
U.S. Cl. 137—519.5 7 Claims



1. A drill string assembly comprising a drill bit connected to the lower end of a string of drill pipe and check valve means

connected in said drill pipe above said drill bit, said check valve means comprising:

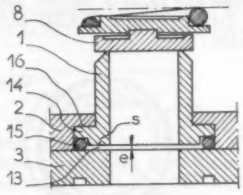
a. a valve body having a longitudinal flowbore therethrough, said flowbore having a lower section, an intermediate section of restricted diameter and a cylindrical upper section of a diameter greater than said intermediate section;
b. seat means carried by said valve body adjacent said upper flowbore section;
c. recess means in said valve body communicating with said flowbore near the upper end of said intermediate section;
d. ball closure means normally carried in said recess means out of said flowbore but movable from said recess means into said upper flowbore section in response to upward flow of fluids through said check valve means above a predetermined rate to sealingly engage said seat means, blocking upward flow of fluids through said drill string assembly; and
e. plug means projecting into said recess means engageable and operable externally of said valve body for engagement with said ball closure means to selectively prevent exit of said ball closure means from said recess means.

4,040,442

VALVE SEAT CONSTRUCTION FOR VALVES FOR CONTROLLING THE PRESSURE OF LIQUIDS

Philippe Alexandre, La Tronche, France, assignor to Societe Generale de Constructions Electriques et Mecaniques Alsthom, Paris Cedex, France

Filed Nov. 28, 1975, Ser. No. 636,143
Claims priority, application France, Dec. 19, 1974, 74.42072
Int. Cl.[2] F16K *15/02*
U.S. Cl. 137—543.17 **4 Claims**



1. An improvement in a valve for controlling the pressure of a liquid in a pipe, the valve having a seat and a shutter bearing, in closed position of the valve, on the seat, the improvement comprising a valve body connected to the pipe and having a recess slidably accommodating the seat, a seal member in said recess between the seat and the pipe, said valve body having a shoulder bounding said recess, the seat being urged against said shoulder, in a normal position, by the pressure of the liquid in the pipe such that a clearance space is formed in said recess between the seat and the pipe to permit slidable movement of the seat in said valve body under the effect of vibration of the shutter.

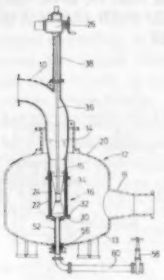
4,040,443

SLEEVE VALVE

Yoshitsugu Okada; Teruaki Nanao, and Toshio Sugino, all of Hirakata, Japan, assignors to Kubota, Ltd., Osaka, Japan

Filed Feb. 13, 1976, Ser. No. 658,116
Claims priority, application Japan, May 27, 1975, 50-71896
Int. Cl.[2] F16K *11/07*
U.S. Cl. 137—546 **4 Claims**

1. A sleeve valve for connection to a reducing chamber comprising a valve body having a peripheral wall formed with a multiplicity of discharge ports extending therethrough, a lower end closed by a bottom cover attached thereto and an upper end secured to an upper wall of the reducing chamber, a valve cylinder gate having open upper and lower ends and slidably fitted in the valve body in contact with the inner surface of the body, the valve cylinder gate being coupled to means operable from outside for upwardly or downwardly driving the gate to control the number of the discharge ports in communication with a water compartment within the gate and



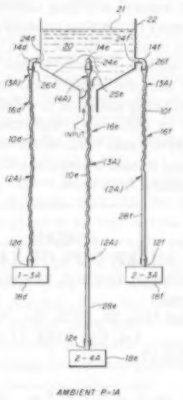
to thereby regulate the flow of water, and a drain tube means secured at its upper end to the bottom cover of the valve body and having a lower end extending through a bottom wall of the reducing chamber and communicating with the outside of the chamber.

4,040,444

AIR-PRECLUDING FLOW REGULATOR

John J. Nolan, Cambridge, Mass., assignor to Sala Magnetics, Inc., Cambridge, Mass.

Filed May 6, 1976, Ser. No. 683,660
Int. Cl.[2] F15D *1/14;* F16L *41/00;* F17D *1/00*
U.S. Cl. 137—561 A **4 Claims**

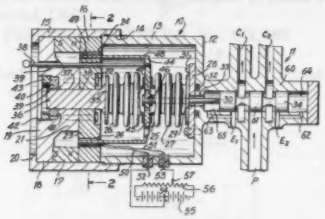


1. An air-precluding flow-regulating device, included in each satellite conduit associated with each orifice located at a higher elevation of a multi-orifice stream-splitter system which feeds a number of satellite devices at lower elevations, whose back pressure is subject to variatons between predetermined lower and upper limits, comprising: a section of normally collapsed, soft, resilient tube forming at least a part of the conduit sealingly connected with its respective said orifice and its respective said satellite, and having a length at least as long as the variation between said lower and upper limits of back pressure at the satellite device expressed in head, said tube being disposed to contain the ambient pressure level within its length.

4,040,445
ELECTRICAL LINEAR FORCE MOTOR FOR SERVO CONTROLS, FLUID VALVES, AND THE LIKE

Joseph F. McCormick, Pawling, N.Y., assignor to Murray A. Ruben, Belmont, Mass.

Continuation of Ser. No. 458,714, April 8, 1974, abandoned. This application Nov. 19, 1975, Ser. No. 633,493
Int. Cl.[2] F15B *13/044;* F16K *31/05*
U.S. Cl. 137—596.18 11 Claims

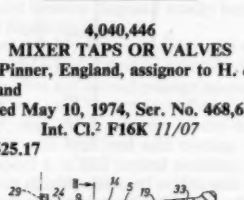


1. A two-way, linear proportional force motor unit for directly operating an hydraulic utilization device, comprising
   a. a permanent magnet connected to magnetic pole pieces and defining an air gap containing a permanent magnetic flux,
   b. an electrical winding in said air gap,
   c. a mechanical coil support for said electrical winding,
   d. a balanced, prestressed, double-acting resilient metallic bellows
   e. said mechanical coil support being connected to said bellows at its effective midpoint from without said bellows whereby said electrical winding is external of said bellows,
   f. said bellows being prestressed in an amount greater than the operating displacement of said mechanical oil support, whereby said bellows is unidirectionally stressed at all times under normal working conditions,
   g. operator means projecting coaxially of the bellows within the confines of said bellows to an exterior point for connection to said utilization device and operatively associated with said mechanical coil support,
   h. said bellows being sealed at one end and in sealed communication at its other end with said hydraulic utilization device, whereby said bellows serves to isolate said air gap from the fluid of said hydraulic utilization device independently of sliding-type seals.

4,040,446
MIXER TAPS OR VALVES

Horace Watts, Pinner, England, assignor to H. & D. E. Watts, Pinner, England

Filed May 10, 1974, Ser. No. 468,656
Int. Cl.[2] F16K *11/07*
U.S. Cl. 137—625.17 11 Claims

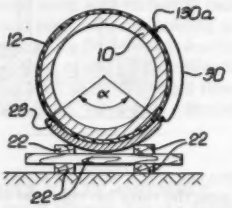


1. A hot and cold water mixing and flow control valve, comprising means forming a housing having a valve chamber therein with a cylindrical bore of a specific diameter; inlet means in said housing means connectible to hot and cold water supplies and including a hot water inlet and a cold water inlet opening laterally into said bore; outlet means in said housing means for discharging said supplies to atmosphere, including an outlet opening into said valve chamber; valve means movable relative to said housing means comprising an actuating means and a generally cylindrical valve member, the valve member being disposed in said bore and movable angularly around said bore and axially along said bore by the actuating means, to control separately the temperature and the rate of flow of the discharge, and the actuating means being operable in two separate modes corresponding respectively to said angular and axial modes of movement of the valve member, and also being operable to a particular axial/angular closed position in which the valve is closed; sealing means between the valve means and the housing means effective to isolate the inlets with respect to each other and with respect to said outlet means; stop means on the valve means and on the housing means for limiting the angular and axial travel of the valve member; said valve member being movable from said particular closed position to the medial axial/angular coordinate open position thereof only by operation of the actuating means in its two modes of movement, and not being movable from said closed position without effecting immediate opening of the valve.

4,040,447
PROTECTION OF PIPE AGAINST DAMAGE TO INSULATION AND/OR CORROSION

Gordon N. Scott, 608 N. Cannon Drive, Beverly Hills, Calif. 90210

Filed July 23, 1975, Ser. No. 598,143
Int. Cl.[2] F16L *3/02;* C23F *13/00*
U.S. Cl. 138—106 14 Claims



1. In combination with a pipe having an insulative covering thereon,
   a. a sacrificially corrodable mount extending in protective and supportive relation beneath the covered pipe, the mount and pipe having respective body portions of different metallic composition,
   b. the mount defining a generally concave receptacle in which underside extent of the pipe and said covering thereon are received, in assembled relation thereto,
   c. a means electrically interconnecting said portions of the pipe and mount so that electrolytic current tends to flow preferentially from the mount to the pipe.

14. A mount for use in combination with a metallic pipe having an insulative covering thereon, comprising
   a. a body defining a generally concave receptacle in which the underside of said covering is receivable in protected and supported relation,
   b. at least a portion of said body consisting essentially of magnesium, there being an extended mesh electrode in electrical contact with substantial lengthwise and widthwise extent of the body, the mesh electrically connected with the pipe.

4,040,448

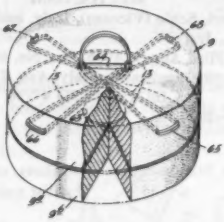
DISPENSER MEMBER FOR FILLING FLUID STORAGE CONTAINERS

William B. Hansel, Media, Pa., assignor to Sun Oil Company of Pennsylvania, Philadelphia, Pa.

Division of Ser. No. 511,821, Oct. 3, 1974, Pat. No. 3,946,758, which is a continuation-in-part of Ser. No. 214,872, Jan. 3, 1972, abandoned, and a continuation-in-part of Ser. No. 280,611, Aug. 14, 1972, abandoned. This application Oct. 16, 1975, Ser. No. 623,190

Int. Cl.[2] F15D *1/02*

U.S. Cl. 138—42 **3 Claims**



1. As an article of manufacture, a cylindrical body able to be passed through a fillpipe, said body made of material which is substantially unaffected by hydrocarbons, said body being porous and having a high void-volume relationship, and a retrorse cord arrangement fastened to said body, wherein said porous body is peripherally sliced parallel to its tp and bottom to form an upper and a lower body of essentially equal size joined at the center and said retrorse cord comprises a plurality of cords connected to a withdrawal device at the center of the face of said upper body and said cords extend through said upper body in an essentially equally spaced apart relationship and are attached to the outer peripheral wall of said upper body.

4,040,449

OIL-TIGHT LAY-IN DUCT

DeForest D. Butler, and Andy Mancik, both of Oxford, Ohio, assignors to Square D Company, Park Ridge, Ill.

Filed Feb. 15, 1974, Ser. No. 443,056

Int. Cl.[2] H02G *3/04, 3/06*

U.S. Cl. 138—92 **8 Claims**

1. A lay-in duct for electric current carrying wires and comprising:

a pair of like open top troughs connected together end to end in alignment with each other, and each having upper lateral marginal flanges at its top extending endwise of the troughs, and each of said marginal flanges having an upper face;

covers for the troughs, respectively;

said covers, in their closed position, having their adjacent ends spaced endwise of the troughs from each other and from said connected ends of the troughs, and each of said covers being of a width such that, in said closed position, its lateral margins overlap said lateral flanges of its associated trough;

means for fastening the covers in closed positions on the troughs, respectively;

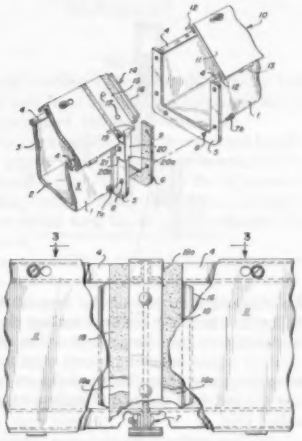
a joint sealing device comprising a rigid body extending endwise transversely of the troughs across the open tops thereof at their connected end portions, and hingedly connected at one of its ends to at least one of said troughs for swinging upwardly to an open position and downwardly to a closed position, selectively;

means on the other end of the body for detachably holding the body in closed position;

said body including a top plate which, in the closed position of the body, extends endwise transversely of the troughs and, has end portions in overlapping relation to both lateral flanges of both troughs at, and adjacent, their connected ends, and a base plate of less length, transversely of the troughs, than the top plate and which, in said closed position, lies within the troughs and extends transversely of the troughs with an end near to the inner lateral limit of the flanges at one side of the troughs and the opposite end near to the inner lateral limit of the flanges at the other side of the troughs;

said base plate being of greater width than the top plate and having lateral margins extending, in a direction endwise of the troughs, beyond the lateral limits of the top plate sufficient distances, respectively, to underlap adjacent end margins of said covers, respectively;

sealing means carried by the body and positioned to lie in sealing relation between said upper faces of the trough flanges and said respective overlapping end portions of the top plate, between under faces of said adjacent end



margins of the covers and upper faces of the underlapping lateral margins of the base plate for substantially the full length, in a direction transversely of the troughs, of said base plate, and directly between the faces of the lateral flanges of the troughs and the faces of those portions of said end margins of the covers overlapping said lateral flanges;

wherein the sealing means includes a single piece of resilient sealing material clamped between the plates and which overlies said base plate at its said lateral margins for their full length transversely of the troughs and endwise of the base plate beyond said end portions of the base plate at and between said lateral margins of the base plate so as to underlie said end margins of the top plate near its ends for the full width of the top plate; and

connecting means securely fasten the plates to each other in said clamping relation to the said piece of material.

4,040,450

PIPE SEALING APPARATUS

Geoffrey A. Boundy, Parafield Gardens, Australia, assignor to Glenys Irene Boundy, Parafield Gardens, Australia

Filed Oct. 20, 1975, Ser. No. 624,407

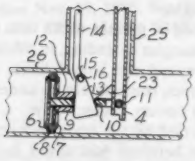
Claims priority, application Australia, Oct. 28, 1974, 9391/74

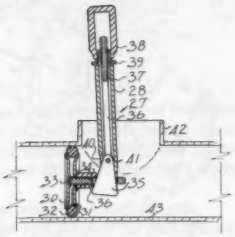
Int. Cl.[2] F16L *55/12*

U.S. Cl. 138—94 **7 Claims**

1. A drain pipe sealing device including a support arm, and a sealing head secured at an end of the support arm, the sealing head including a resilient sealing ring and coreactive members supported for relative movement one with respect to the other to cause outward peripheral sealing expansion of the resilient

sealing ring to a sealing position and to allow the resilient sealing ring to contract from the sealing position, the invention being characterized in that the sealing head is secured to the support arm by means including control means operable to move the sealing head to a first position in which the resilient sealing ring has its axis aligned substantially parallel with respect to the elongate direction of the support arm and to a second position in which the resilient sealing ring has its axis aligned transversely to the elongate direction of the support arm, said control means including a cam member operable to provide the relative movement between the co-reactive members to cause the outward peripheral sealing expansion of the resilient sealing ring.



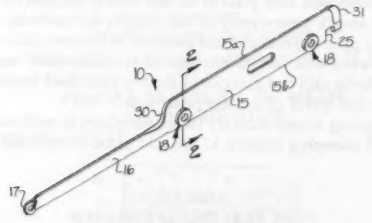


4,040,451

TRIAXIAL WEAVING MACHINE HAVING HEDDLES WITH WEFTWISE LATERAL PROJECTIONS

Wayne C. Trost, Rockford, and John B. Capps, Forreston, both of Ill., assignors to Barber-Colman Company, Rockford, Ill.

Filed Aug. 23, 1976, Ser. No. 716,825
Int. Cl.[2] D03C *13/00*
U.S. Cl. 139—48 **9 Claims**



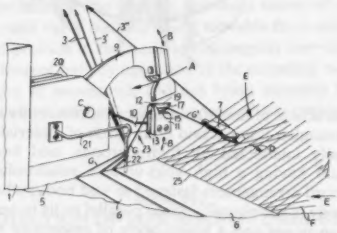
1. In a weaving machine for making triaxial fabric and having a plurality of elongate heddles arranged in weftwise rows for guiding respective warp strands, means for longitudinally moving said heddles for forming the warp strands guided thereby into warp sheds, means defining passageways for guiding said heddles during longitudinal movement, and means for moving said heddles and the warp strands guided thereby weftwise during weaving to shift heddles from one passageway to another and to move the warp strands from one weftwise location to another, each of said heddles having a body portion and an elongate reduced width frontal portion for engagement with a warp strand, the improvement in said heddles which comprises each of said heddles having means on said body portion thereof spaced from said frontal portion and for preventing entrance of more than one heddle into the same passageway.

4,040,452

DEVICE FOR HOLDING CUT WEFT THREADS TO BE FOLDED UP INTO THE SHED TO FORM A TUCKED SELVEDGE IN A FABRIC MADE BY A SHUTTLELESS LOOM HAVING A CONTINUOUS WEFT SUPPLY MECHANISM

Nicola Santucci, Schio (Vicenza), Italy, assignor to Nuovo Pignone S.p.A., Italy

Filed Aug. 1, 1975, Ser. No. 601,169
Claims priority, application Italy, Aug. 2, 1974, 25942/74
Int. Cl.[2] D03D *47/36*
U.S. Cl. 139—302 **2 Claims**



1. A device for retaining the cut weft thread to be folded up into the shed to form a tucked selvedge as the selvedge being formed on a shuttleless loom comprising in combination:

a weft cutting device coupled to the loom having upper and lower cutters,

a plate mounted on the lower cutter having a planar gripping surface for holding the weft thread in a taut condition after cutting and a cutting edge on said cutter located in the same plane with said surface,

a generally rectangular frame member open on one side and having a resiliently biased thread pressing member mounted to the free end of the frame and in engagement with the gripping surface, said other end being adjustably coupled to the plate and capable of adjustment in a direction perpendicular to the gripping surface to regulate the bias of the thread pressing member, and,

a holding member for positioning the weft threads to be folded into the shed to form a tucked selvedge comprising an elongated member coupled to the cutting device at one end and having an upper portion extending substantially parrallel to the selvedge and a lower portion extending downwardly therefrom to the other end in a place substantially perpendicular to the edge of the selvedge.

4,040,453

SHUTTLELESS LOOM OF THE SINGLE OR DOUBLE LAYER TYPE

Yves Juillard, and Victor Riner, both of Mulhouse, France, assignors to Societe Alsacienne de Constructions Mecaniques de Mulhouse, of Mulhouse Cedex, France

Filed Aug. 2, 1976, Ser. No. 710,703
Claims priority, application France, Aug. 4, 1975, 75.24220
Int. Cl.[2] D03D *47/18*
U.S. Cl. 139—446 **5 Claims**

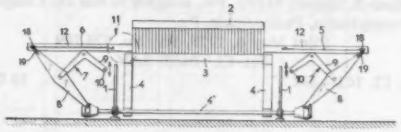
1. A shuttleless loom, having

a slay, a planar read carried by said slay, horizontal, longitudinally-reciprocating, floating weft-inserting needles, each having an inner extremity and an outer extremity

with said inner extremity resting against said reed and a lower sheet of warp threads, and with said outer extremity being movable along a predetermined path of travel,

a sliding shoe operatively connected to said outer extremity of each said needle,

a driving member having a portion adapted to support said sliding shoe and to reciprocate in said path of travel of said outer extremity of said needle,



an unbounded longitudinal sliding surface carried by said slay in coplanar, relationship with respect to said reed and extending close to said path of travel of said outer extremity of said needle.

and elastic means resiliently applying said sliding shoe against said sliding surface.

4,040,454

DRAWING GRIPPER FOR GRIPPING AND TRANSPORTING WEFT YARNS IN CONTINUOUS WEFT FEED LOOMS

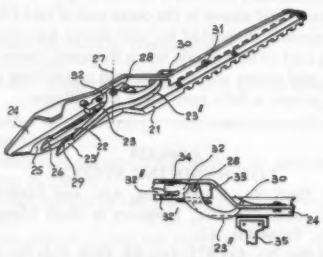
Graziano Genini, Stabio, Switzerland, assignor to Albatex A.G., Vaduz, Liechtenstein

Filed Sept. 23, 1975, Ser. No. 616,059

Claims priority, application Switzerland, Sept. 23, 1974, 12832/74; Sept. 11, 1975, 11805/75

Int. Cl.[2] D03D *47/22*

U.S. Cl. 139—448 **3 Claims**



1. A drawing gripper for gripping and transporting weft yarns in continuous weft feed looms, from a point at the center of the shed and to draw the yarn out of the shed, comprising a support, a fixed member secured to said support, a movable member mounted on said suppport for oscillation toward and away from the fixed member in a horizontal plane about a vertical axis, said fixed member terminating in a hook disposed in a vertical plane, an end of said movable member swinging horizontally in and out of said hook, and spring means urging said end into said hook, said end of said movable member having an upper surface and the inside of said hook having a lower surface, said surfaces coacting releasably to grasp said yarn between them, said surfaces being conjugated helical surfaces of variable pitch that decrease both in distance from each other and in inclination to the horizontal in a direction toward the end of said movable member.

4,040,455

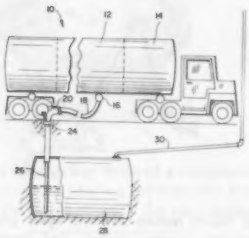
AUTOMATIC SHUT OFF FOR GRAVITY FILLING SYSTEM FOR LIQUID STORAGE TANKS

Leonard W. Swain, London, Canada, and Allen M. Bower, Painsville, Ohio, assignors to Emco Limited, London, Canada

Filed Feb. 24, 1976, Ser. No. 660,995

Int. Cl.[2] B67D *5/00*

U.S. Cl. 141—225 **7 Claims**



1. In a liquid loading system for the gravity loading of a liquid storage tank from a tank truck having at least one liquid shipping compartment, the improvement of;

a. a normally open substantially unrestricted liquid fill line in which a partial vacuum is drawn in response to the passage of liquid therethrough under the influence of gravity, said fill line opening from the shipping compartment and being connected to a liquid input passage of the liquid storage tank,

b. valve means in said line movable between an open position in which said line is open to permit the flow of liquid therethrough and a closed position in which said line is closed to interrupt the flow of liquid to the storage tank, said valve means being normally open and urged to said closed position,

c. pressure responsive latch means engaging said valve means and releasably locking said valve means in said normally open position,

d. vent passage means having a first end communicating with said pressure responsive latch means and a second end opening into said storage tank at a predetermined level below the upper end of the tank,

e. vacuum passage means communicating between said pressure responsive latch means and a vacuum source in said fill line whereby the flow of liquid through the fill line during the filling of the storage tank draws a vacuum in the vacuum passage at the vacuum source which is insufficient to activate said pressure responsive latch means to retain said valve means in the open position until the level of liquid in the storage tank rises to close said other end of said vent line whereupon the full vacuum is applied to the pressure responsive latch means thereby releasing the valve which moves to its normally closed position.

4,040,456

OPENABLE BOTTOM LOADING ADAPTER FOR TRANSPORT TANK

Joseph H. DeFrees, 505 Liberty St., Warren, Pa. 16365

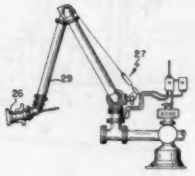
Filed Jan. 28, 1976, Ser. No. 652,985

Int. Cl.[2] B67C *11/04*; B65B *39/00*

U.S. Cl. 141—349 **10 Claims**

1. A fabricated adapter valve for controlling flow of liquid to and from a transportation tank comprising, a hollow body portion, a coupling portion secured to one end of the body portion in liquid tight relation, said coupling portion being adapted for coupling to a compatible loading coupler of a loading island for liquids, a flange portion secured in liquid tight relation to the other end of said body portion adapted for coupling to a liquid flow conduit to the tank, said flange portion defining an exit opening for liquid, said coupling portion having a liquid inlet opening therein, valve means mounted in

said body portion intermediate said inlet and said exit openings for opening and closing said inlet opening and including biasing means automatically urging said valve means toward closed condition, a manually operable actuator mounted on said valve and accessible from exteriorly of said valve, said actuator including cam means pivotal in said body portion about a fixed point and coacting with said valve means for



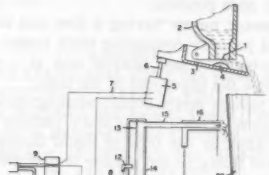
moving said valve means toward open position against the resistance of said biasing means, and means for selectively maintaining said valve means in open condition while permitting release of said actuator by an operator, the last mentioned maintaining means including a generally sinuous configuration on said cam means adapted for holding coaction with said valve means.

4,040,457

AUTOMATIC OPENING OF JUICE OUTFLOW CONDUIT IN RESPONSE TO DETECTION OF CONTAINER, WITHOUT PHYSICAL CONTACT

Karl Niese, Kronberg, and Eckhard Hundhausen, Westerland, both of Germany, assignors to Braun Aktiengesellschaft, Frankfurt am Main, Germany

Filed Oct. 21, 1975, Ser. No. 624,206
Claims priority, application Germany, Oct. 22, 1974, 2450059
Int. Cl.[2] B65B *3/06*
U.S. Cl. 141—361 **14 Claims**



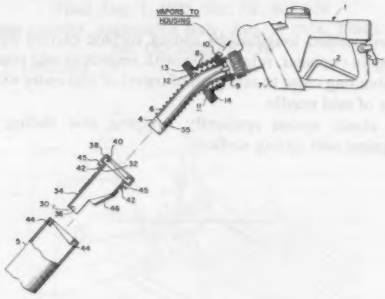
1. In a juice dispensing apparatus, particularly a household tabletop juicer or juice centrifuge, of the type having a jucie outflow conduit below the outlet of which a glass or other container is placed for filling the container with juice, in combination, first means for opening and closing the outlet of the juice outflow conduit in automatic response to the receipt of opening and closing command signals, respectively; and second means operative for detecting the presence of a container below the outlet of the juice outflow conduit without physically contacting the container and operative for generating an opening command signal in response to the detection of the placement of a container below the outlet of the juice outflow conduit and a closing command signal in response to the detection of the removal of a container from below the outlet of the juice outflow conduit, wherein the second means comprises a signal transmitter operative for transmitting a signal towards the location occupied by a properly positioned container and a signal receiver operative for detecting the presence of a properly positioned container by detecting the reflection of the transmitted signal back from the container.

4,040,458

GASOLINE TANK FILLPIPE ADAPTER

William B. Hansel, Media, Pa., assignor to Sun Oil Company of Pennsylvania, Philadelphia, Pa.

Filed May 6, 1975, Ser. No. 575,109
Int. Cl.[2] B65B *3/04*
U.S. Cl. 141—392 **10 Claims**



5. A combination for use in filling an automobile gasoline tank through a fillpipe, comprising: an automobile gasoline dispensing nozzle having a spout of standard diameter with a port therein for controlling the operation of the nozzle valve shutoff mechanism; a rigid cylindrical sleeve dimensioned to be mounted inside the gasoline tank fillpipe with the upper side of the rigid sleeve extending along a substantial portion of the length of a nozzle spout to prevent upward movement of a nozzle spout inserted in the adapter and to hold the spout with its axis approximately colinear with the fillpipe axis, means for mounting said rigid sleeve in the outer end of said fillpipe, and a sealing member supported by said sleeve for covering the controlling port of said nozzle when the spout thereof is being inserted in said sleeve and to leave said controlling port open when said nozzle is fully inserted in said fillpipe.

4,040,459

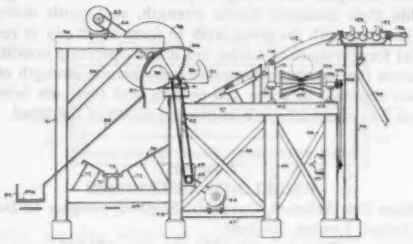
LOG HANDLING SYSTEM

Thomas P. Bush, Jr., Birmingham, Ala., and Samuel Edward Grant, Jacksonville, Fla., assignors to Bush Manufacturing Company, Trussville, Ala.

Division of Ser. No. 432,872, Jan. 14, 1974, Pat. No. 3,908,495, which is a division of Ser. No. 117,257, Sept. 2, 1971, Pat. No. 3,799,015. This application May 19, 1975, Ser. No. 578,472
Int. Cl.[2] B27B *1/00*
U.S. Cl. 144—312 **4 Claims**

1. In a method of processing logs, including the steps of:
   a. advancing a plurality of logs in a first predetermined direction along a path transverse to the longitudinal axis of said logs;
   b. segregating said logs, during the advancing of the logs in the transverse path, according to size;
   c. advancing first segregated ones of said logs in a second direction along a path parallel to the longitudinal axis of said logs;
   d. advancing second ones of said segregated logs in said first predetermined direction;
   e. severing said second ones of said segregated logs substantially simultaneously at a plurality of special locations

after the same have been segregated and advanced after segregation; and



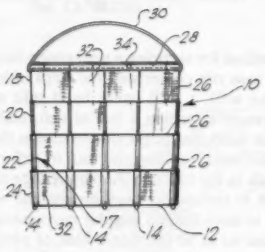
f. advancing said severed logs in said second predetermined direction.

4,040,460

COLLAPSIBLE BUCKET

Sidney Thornton, 323 South 11th Ave., Mount Vernon, N.Y. 10550

Filed Dec. 23, 1975, Ser. No. 643,786
Int. Cl.[2] A45C *7/00*
U.S. Cl. 150—48 5 Claims



1. A collapsible bucket, comprising:
a. a bottom rim;
b. a plurality of base support members affixed to said bottom rim;
c. a plurality of telescoping erecting members affixed to said bottom rim;
d. a plurality of support rings affixed to said telescoping erecting members;
e. a top rim affixed to the top of said telescoping erecting members;
f. a handle affixed to said top rim; and
g. a collapsible fabric member disposed over said top rim and secured thereto.

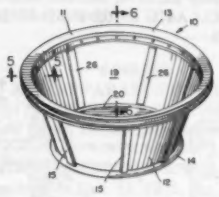
4,040,461

NESTABLE FRUIT HARVESTING CONTAINER

William S. Carson, 218 Escambia Drive, Winter Haven, Fla. 33880

Filed Aug. 9, 1976, Ser. No. 712,946
Int. Cl.[2] B65D *33/14*
U.S. Cl. 150—51 10 Claims

1. A nestable fruit harvesting container comprising a generally frusto-conical frame and a flexible bag supported within the frame, the frame comprising a top ring and a bottom ring and a plurality of brace strips which extend between the top and bottom rings and which are secured thereto at circumferentially spaced locations therearound, the diameter of the bottom ring being less than the diameter of the top ring and the brace strips extending outwardly and upwardly from the bottom ring toward the top ring, the outside of the bag engaging and being supported by the brace strips, and a reinforcing strip secured to the inside of the bag opposite each of the brace strips, whereby a plurality of containers can be nested within



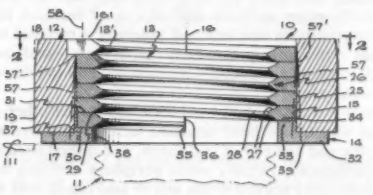
each other and the reinforcing strips of a container protect the bag of the container from chafing between the brace strips of the container and the brace strips of the next higher container.

4,040,462

FASTENERS HAVING THREADS FORMED OF ESSENTIALLY HELICAL COIL STRUCTURES

Mark Hattan, Balboa, Calif., assignor to William P. Green, Pasadena, Calif., a part interest

Continuation of Ser. No. 390,741, Aug. 23, 1973, abandoned, which is a continuation of Ser. No. 229,990, Feb. 28, 1972, abandoned, which is a continuation-in-part of Ser. No. 121,817, March 8, 1971, abandoned. This application Aug. 18, 1975, Ser. No. 605,456
Int. Cl.[2] F16B *39/38*
U.S. Cl. 151—14 CS 21 Claims



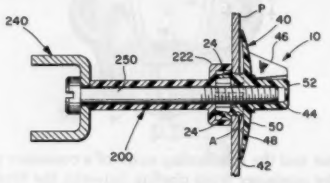
1. A high strength composite lock nut comprising an essentially tubular case, and a separately formed coil structure contained within said case and having a hardened radially inner portion in work hardened condition shaped to form a thread, said coil structure having a plurality of turns with radially outer portions bonded directly to a surrounding portion of said case and softer than said inner thread portion, said coil structure having, at a location offset axially from said bonded turns, a locking portion which is within the case but not bonded to the portion thereof which is located directly radially outwardly of said locking portion, said locking portion being shaped to project radially inwardly farther than said bonded turns and inwardly far enough to have a self-locking action with a coacting screw and to require deformation of the self-locking portion radially outwardly upon threaded engagement with the screw, said portion of the case which is located directly radially outwardly of said locking portion of the coil structure having an inner surface extending approximately directly axially and engaged by an approximately directly axially extending external surface of said locking portion in a relation blocking said radially outward deformation of said locking portion and requiring slight radially outward deformation of the case itself at the location of said locking portion upon threaded engagement of said locking portion with said screw, so that the strength of the case is added to that of the locking portion of the coil structure for maximizing said locking action, said locking portion being fixed at its opposite ends against even slight relative movement of said ends in a direction to circularly elongate and thus radially constrict the locking portion.

4,040,463

FASTENER

Stephen Petrus, Parma, Ohio, assignor to Eaton Corporation, Cleveland, Ohio

Filed July 12, 1974, Ser. No. 488,615
Int. Cl.[2] A47G 29/02; F16D 39/28
U.S. Cl. 151—41.75 7 Claims



1. A one-piece, molded fastener for sealing, self-retention in an apertured panel, said fastener comprising:

an axially extending shank having a cross-sectional shape closely conforming to the cross-sectional shape of said panel apertures, one end of said shank having a plurality of radially outwardly extending protuberances thereon, said one end of said shank having a plurality of radially and axially extending slots therein, the intersection of said slots being generally coaxial with the axis of said shank and defining an axially extending, fastener receiving cavity, said protuberances having an inclined, radially outer surface, said radially outer surface being radially inwardly inclined toward said one end, the inner surfaces of said shank axially coincident with said protuberances being radially outwardly inclined away from said one end, said radially outer surfaces and said inner surfaces meeting substantially at said one end whereby a member making axial sufficiently pressurized contact with said one end will cause said shank adjacent said one end to fold radially inwardly; and

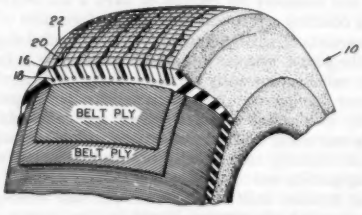
a semi-spherical, dished head attached to the other end of said shank, said head attached with its concave surface facing said one end of said shank, said dished head having a continuous, radially outer periphery defining a plane substantially normal to the axis of said shank, said defined plane being spaced from said protuberances by an axial distance less than the thickness of said aperture panel, said dished head having a continuous substantially convex surface opposite its concave surface.

4,040,464

PNEUMATIC TIRE AND METHOD OF MAKING SAME

Frank Oren Skidmore, 2513 Third St., Cuyahoga Falls, Ohio 44221

Filed Jan. 2, 1976, Ser. No. 645,992
Int. Cl.[2] B60C 9/22
U.S. Cl. 152—361 R 8 Claims



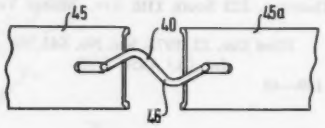
1. A pneumatic tire having a tread layer having a tread design, a carcass, a strip of siping material positioned in the tread layer over the full circumference thereof and at a depth about equal to the depth of the tread design and across a substantial width of the tread, which is characterized by the siping material including longitudinally extending cords which extend in longitudinal, substantially parallel relationship around the full circumference of the tire, said cords having great tensile strength, and being subject to minimum elongation within their designed tensile strength, said cords acting in conjunction with the tread layer to form a belt ply to reduce radial force variations in the tire under operating conditions, wherein the longitudinal cords have a tensile strength of between about 75 to about 150 pounds, and there are between about 8 to about 20 cords across the width of the tread.

4,040,465

WHEEL RIM ASSEMBLIES

William Eric Mitchell, Coventry, England, assignor to Dunlop Limited, London, England

Filed June 25, 1974, Ser. No. 483,023
Claims priority, application United Kingdom, June 30, 1973, 31287/73
The portion of the term of this patent subsequent to Nov. 11, 1992, has been disclaimed.
Int. Cl.[2] B60C 25/12
U.S. Cl. 152—381.1 3 Claims



1. A method for securing a well cover band around the well of a well base rim comprising the steps of locating in position around the well, a well cover band split at one point of its circumference, attaching a link of deformable material to the ends of the band, locating a slotted tool in the gap between the ends of the band, rotating the tool to deform the link to produce a kink in the link and thereby reduce the effective length of the link to tension the band around the well, the tool being arranged to have limited angular movement between the ends of the band so as to provide a kink of predetermined dimensions.

2. A wheel rim assembly comprising a rim having a well disposed between tire bead seats, a well cover band arranged to extend circumferentially around the well so as to prevent a tire bead from entering the well, the well cover band defining in combination with the rim a circumferential groove adjacent one bead seat, the groove being arranged to receive an extended toe of the associated tire bead when a tire is mounted thereon to prevent axial inward displacement of the bead, the well cover band being provided with radially inwardly turned edges which are arranged to rest on circumferentially extending step portion formed one on each side of the well, the cover band being split at one side of its circumference, and a link of deformable material to connect the ends of the band, the link having sufficient rigidity to hold the ends of the band against circumferential displacement relative to one another after deformation of the link to secure and tension the band around the well.

4,040,466

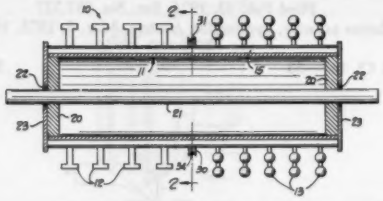
INVESTMENT SHELL MOLDING PROCESS

Robert A. Horton, Chesterland, and Timothy R. Bauer, Richmond Heights, both of Ohio, assignors to Precision Metalsmiths, Inc., Cleveland, Ohio

Filed Oct. 23, 1975, Ser. No. 625,137
Int. Cl.[2] B22C 09/02, 13/08
U.S. Cl. 164—17 2 Claims

1. In a method of making a refractory shell mold, the improvement comprising the steps of preparing a pattern tree including a support member, patterns attached to said support member, and an outwardly projecting divider extending about

the said support member, said divider having an outwardly opening, circumferential groove bounded by knife-like edges, wrapping a strand about said divider at the bottom of said



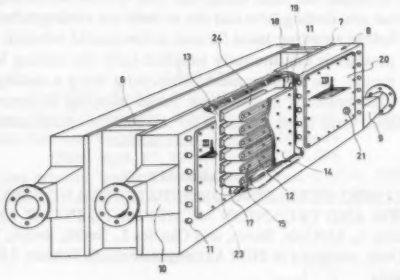
groove, applying refractory material to said tree to form a mold shell extending over said divider and embedding said strand, and thereafter unwrapping said strand to separate said shell into sections.

4,040,467

CONTINUOUS-CASTING SYSTEM WITH ELECTRO-MAGNETIC MIXING

Robert Alberny, and Louis Vedda, both of Metz, France, assignors to Institut des Recherches de la Siderurgie Francaise, Saint-Germain-en-Laye, France

Filed Sept. 15, 1976, Ser. No. 723,647
Claims priority, application France, Sept. 19, 1975, 75.28702
Int. Cl.[2] B22D *11/10*
U.S. Cl. 164—49 **10 Claims**



1. In a method of continuous casting wherein molten metal is poured into the top of a mold formed as an upright tube having at least one relatively long upright wall, the improvement comprising:

forming a plurality of independent magnetic fields of respective field-strength characteristics at a plurality of respective horizontally spaced locations along said long wall;

displacing each of said fields continuously vertically with a respctive speed characteristic; and

varying at least one of the characteristics of each of said fields relative to the corresponding characteristics of the other fields to vary the electromagnetic mixing effect in said metal along said long wall.

7. A continuous-casting apparatus comprising:

an upright tubular mold having a pair of long walls and a pair of short walls, whereby molten metal can be poured into the top of said mold and an ingot withdrawn from the bottom thereof continuously;

a hollow cooling box on each of said long walls;

means including respective inlets and outlets for passing a fluid coolant through said boxes thereby cooling said long walls;

a pluality of horizontally spaced groups of vertically spaced inductors in each of said boxes, each of said inductors being energizable to form a field having a respective strength characteristic and movable with a predetermined speed characteristic; and

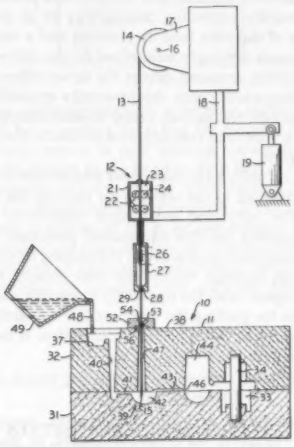
supply means for each of said groups for energizing the respective groups and varying at least one of the characteristics thereof relative to the corresponding characteristics of the other groups.

4,040,468

METHOD AND APPARATUS FOR INTRODUCING ADDITIVES INTO A CASTING MOLD

John R. Nieman, Pekin, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Division of Ser. No. 488,756, July 15, 1974, Pat. No. 3,991,810.
This application Dec. 15, 1975, Ser. No. 640,513
Int. Cl.[2] B22D *1/00, 27/00*
U.S. Cl. 164—55 **3 Claims**



1. A method for introducing additives into a molten metal being poured into a casting cavity formed within a casting mold, comprising the steps of:

providing a passageway within the casting mold and having an upwardly extending portion and a flow path for directing molten metal into the casting cavity, said upwardly extending portion being connected to said flow path at its lower end;

positioning a wire feed mechanism above the casting mold;

lowering the wire feed mechanism relative to the casting mold to a position at which the wire feed mechanism is aligned with the upwardly extending portion of the passageway and guiding an end of the wire of additive material into the upwardly extending portion of the passageway to position said end within said portion;

feeding a flow of molten metal into and through the flow path;

feeding the wire of additive material downwardly from the wire feed mechanism into the upwardly extending portion of the passageway and into the molten metal for erodibly mixing with the molten metal prior to its entry into the casting cavity;

adjusting the feed rate of the wire to match the melting rate of the wire; and

stopping the feeding of the wire from the wire feed mechanism, and raising the wire feed mechanism relative to the casting mold to raise the end of the wire from the flow path and upwardly extending portion of the passageway at the completion of feeding the molten metal into the flow path.

2. An apparatus for introducing additives into a molten metal being poured into a casting mold comprising:

a casting mold having an internal casting cavity, and pas-

sageway means formed within the casting mold including an upwardly extending passageway and a flow path for directing molten metal into the casting cavity, said upwardly extending passageway being connected to said flow path at its lower end;

pouring means separate from the casting mold for holding and feeding a flow of molten metal through the flow path into the casting cavity;

means for holding a supply of wire of additive material remote from the casting mold;

a wire feed mechanism positioned above the casting mold and movable between a first position at which the wire feed mechanism is aligned with the upwardly extending passageway and an end of the wire is in position to be fed into the upwardly extending passageway and a second position at which the end of the wire is removed from the upwardly extending passageway, said wire feed mechanism including a plurality of drive rollers positioned above the upwardly extending passageway in at least the first position of the wire feed mechanism and a variable speed drive means drivingly connected to the drive rollers and which, when actuated, drives the drive rollers to feed the wire downwardly into the upwardly extending passageway and into the molten metal flowing through the flow path at a wire feed rate adjusted to match the melting rate of the wire;

a support on which the wire feed mechanism is mounted;

means connected to the support for moving the support and hence the wire feed mechanism relative to the casting mold between the first and second positions; and

a guide positioned outwardly of the casting mold and having a passage through which the wire passes, said passage being aligned with the upwardly extending passageway of the mold for guiding the wire into the upwardly extending passageway as the wire feed mechanism is moved to the first position.

4,040,469

CASTING OF MOLTEN METALS

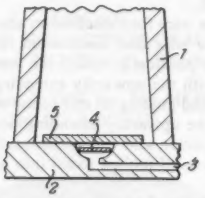
Pierre Roger Potier, La Celle Saint Cloud, France, and Tadamichi Sota, Kurashiki, Japan, assignors to Foseco International Limited, Birmingham, England

Filed June 14, 1976, Ser. No. 695,553

Claims priority, application United Kingdom, July 10, 1975, 29158/75

Int. Cl.[2] B22D *27/00*

U.S. Cl. 164—56 **6 Claims**



1. In a process for casting an ingot from a molten metal by bottom pouring molten metal into an ingot mould through a molten metal inlet located adjacent the bottom of said mould and wherein there is located in the ingot mould a bonded flux composition consisting essentially of at least one fluxing agent, the improvement which comprises locating in the ingot mould adjacent said inlet a bonded refractory composition consisting essentially of particulate refractory material and fibrous material, the bonded refractory composition being positioned in relation to the bonded flux composition so that molten metal first entering said mould contacts said bonded refractory composition before contacting said bonded flux composition thereby protecting the latter from the initial upsurge of molten metal when pouring commences.

4,040,470

METHOD OF CONTINUOUSLY CASTING STEEL

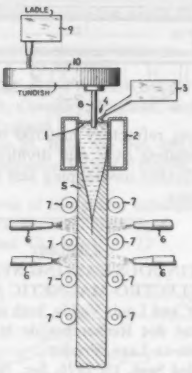
Thorwald Fastner, Linz, Austria, assignor to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellsch..t, Linz, Austria

Filed Feb. 13, 1976, Ser. No. 657,727

Claims priority, application Austria, Mar. 5, 1975, 1685/75

Int. Cl.[2] B22D *11/10*

U.S. Cl. 164—58 **5 Claims**



1. In a method of continuously casting steel to form strands in continuous casting plants having at least one casting tube and a mould, the steel being cast into the mould through said at least one casting tube and the at least one casting tube reaching below a casting level formed in the mould wherein a casting powder is continuously supplied onto the casting level in the mould, the improvement comprising using a casting powder that contains at least one metal alloying component in metallic form to be taken up by the surface of the strand.

4,040,471

METHOD OF MAKING OR REPAIRING AND SECURING LUGS AND TRUNNION MEMBERS TO INGOT MOLDS

Walter A. McCray, Berea, and Charles L. Smith, Salem, both of Ohio, assignors to Hilti Aktiengesellschaft, Schaan, Liechtenstein

Filed June 6, 1975, Ser. No. 584,298

Int. Cl.[2] B22D *19/10*; B23K *23/00*

U.S. Cl. 164—92 **8 Claims**

1. A method for making and securing a lug or trunnion member to an ingot mold which comprises:

a. positioning the mold so that the area of the side of the ingot mold where the member is to be located, is substantially horizontal and uppermost;

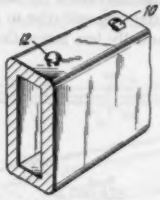
b. forming a member casting space from a refractory material on the uppermost side of the ingot mold, said casting space having a size and shape corresponding to the shape of the member to be formed, and a bottom area of a size and shape corresponding to the base of the member where it is secured to the ingot mold and said bottom area being in registration with the base area of the side of the ingot mold where the member is to be secured, the upper most portion of the space being open and forming a top entrance to the casting space;

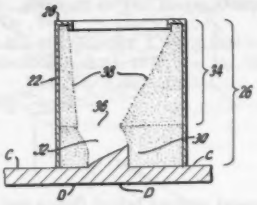
c. forming a casting material feeding chamber from refractory material, directly above and contiguous with the top entrance, said feeding chamber having a funnel shape, the smaller bottom opening being in registration and communicating with the entrance of the casting space entrance; the casting space and feeding chamber forming a single welding chamber closed on all sides except the top;

d. filling the welding chamber with an alumino thermic

material in an amount effective to provide sufficient weld metal for forming the member; and

e. igniting said alumino thermic mixture; whereby molten metal is formed from the alumino thermic reaction, and feeds downwardly by gravitation through said feeding chamber and into the casting space to form, on cooling, the member.



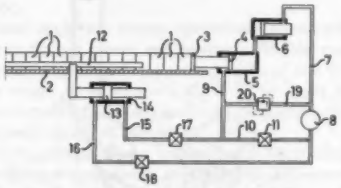


4,040,472

CASTING MOULD ADVANCING PLANT

Henning Borge Lundsgart, Karlslunde, Denmark, assignor to Dansk Industri Syndikat A/S, Herlev, Denmark

Filed Sept. 17, 1976, Ser. No. 724,695
Claims priority, application Denmark, June 4, 1976, 2498/76
Int. Cl.[2] B22C *11/08, 19/04, 25/00;* B22D *33/04*
U.S. Cl. 164—154 1 Claim



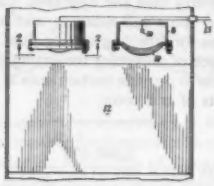
1. A plant for stepwise advancing a casting mould comprising uniform mould parts which are closely piled together on a conveyor path having a preparatory section where the mould parts are successively added to the already existing casting mould by means of a hydraulically operated main piston, followed by pouring, solidification and cooling sections, of which at least the last-mentioned section includes a mould advancing device which during the advance steps is moved synchroneously with the main piston by means of at least one hydraulic unit fed with hydraulic liquid displaced by the main piston, wherein the hydraulic unit of the mould advancing device is a hydraulic cylinder with a piston, the effective area of which exceeds the effective displacement area of the main piston, said cylinder being connected to the main pump of the plant via a pipe including a differential pressure valve for supplying additional hydraulic liquid to the hydraulic cylinder when the pressure difference between the two sides of the main piston exceeds a preset value.

4,040,473

ANNULAR LENS CLEANER

Lewis Halsay Wheeler, Almond, N.Y., assignor to The Air Preheater Company, Inc., Wellsville, N.Y.

Filed Aug. 13, 1976, Ser. No. 714,164
Int. Cl.[2] F28D *17/00*
U.S. Cl. 165—5 3 Claims



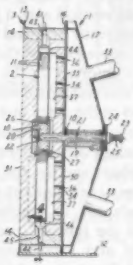
1. A heat exchanger having a housing including inlet and outlet ports for a heating fluid and for a fluid to be heated, a heat absorbent matrix in said housing, means for alternately subjecting the matrix to the heating fluid and to the fluid to be heated, a detector of infrared rays being emitted by the matrix, a viewing lens confronting the matrix to focus the rays upon said detector, a source of clean air, an annular base member holding the viewing lens, an annular plenum chamber in said annular base, and an annular slot extending completely around said base member to exhaust clean air over the periphery of said lens.

4,040,474

HIGH EFFICIENCY HEAT EXCHANGER WITH CERAMIC ROTOR

Paul D. Stroom, Minneapolis, and Carl J. Braunreiter, Maplewood, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Dec. 8, 1975, Ser. No. 638,831
Int. Cl.[2] F28D *19/00*
U.S. Cl. 165—9 4 Claims



1. A high effeciency, high temperature gas regenerative heat exchanger having:

a ceramic rotor formed of a plurality of parallel, axial gas flow passages and having a substantially cylindrical circumference;

a housing having front and rear partition members located near the front and back of said rotor for dividing the rotor into at least one high temperature and at least one low temperature duct;

a drive shaft assembly that is journaled in the housing for mounting said rotor, which assembly includes an outer portion and an inner portion that is rotatably disposed in said outer portion;

a pair of pressure plates having parallel surfaces, one of which plates is connected to the outer shaft portion and the other of which is connected to the inner shaft portion;

bias means for exerting oppositely directed forces on said shaft portions to urge said pressure plates toward one another to securely clamp said rotor between said parallel surfaces of said plates;

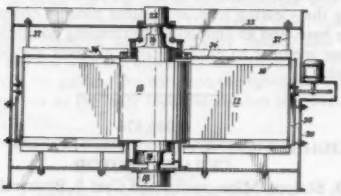
insulating means disposed on an inner portion of said housing to prevent heat transfer through the housing, said rotor and said housing being of such size that there is an annular channel between said housing and the outer circumference of said rotor, said channel being 1–10 times greater in width than the hydraulic diameter of the passages in said rotor and wherein said housing further includes means for directing sealing fluid at segments of the circumference of said rotor traversing between said partition members to provide curtain seals at such circumferential segments of said rotor.

4,040,475

AXIALLY MOVABLE SECTOR PLATE SUPPORT FOR ROTARY REGENERATIVE HEAT EXCHANGER

Richard Franklin Stockman, Friendship, and Roderick Jay Baker, Belmont, both of N.Y., assignors to The Air Preheater Company, Inc., Wellsville, N.Y.

Filed July 12, 1976, Ser. No. 704,705
Int. Cl.[2] F28D *19/00*
U.S. Cl. 165—9 **7 Claims**



1. Rotary regenerative heat exchange apparatus having a mass of heat absorbent material disposed for rotation concentrically about a vertical rotor post, a housing surrounding said rotor including end plates at opposite ends of the rotor having apertures that direct the flow of heating fluid and fluid to be heated through the rotor, bearing means supporting the rotor for rotation about its vertical axis, a guide bearing intermediate the upper end of the rotor post and the rotor housing adapted to preclude radial movement of the rotor post, a housing for the guide bearing supported by the rotor post and adapted to move axially with thermal expansion of the rotor, sector plates intermediate an end of the rotor and the end plates of the rotor housing adapted to separate the heating fluid from the fluid to be heated, post sealing means intermediate the radially inner end of the sector plates and the rotor post precluding the flow of fluid therebetween, and support means depending from the bearing housing adapted to simultaneously support the post sealing means and the inboard ends of the sector plates for independent radial and axial movement whereby the post sealing means and the sector plates may move freely in response to thermal variations of the rotor.

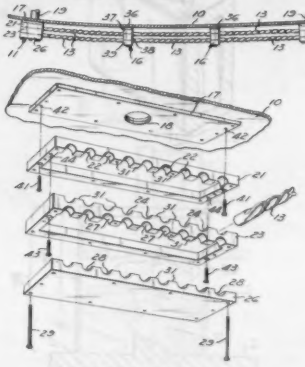
4,040,476

KEEL COOLER WITH SPIRAL FLUTED TUBES

Byron J. Telle, Louisville, and John R. Sudyk, Huntsburg, both of Ohio, assignors to The Johnson Rubber Company, Chagrin Falls, Ohio

Filed July 9, 1975, Ser. No. 594,289
Int. Cl.[2] F28F *9/04*
U.S. Cl. 165—76 **7 Claims**

1. An elongated marine heat exchanger system comprising a supporting hull having a curvature in the direction of the length of said system, a pair of spaced headers secured to said hull at the ends of said system, a substantially continuously helically fluted heat exchanger tube connected at each end to one of said headers for a flow of fluid between said headers, said tube being supported so that it is curved along its length to substantially match the curvature of said hull, said helical fluting of said tube permitting said tube to assume such curved condition with substantially less strain than a tube of similar



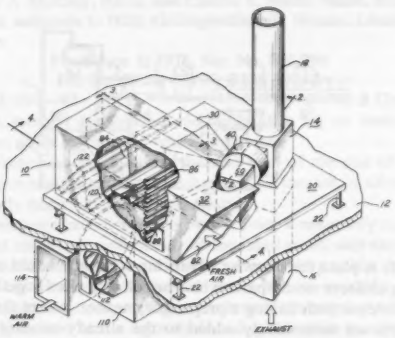
size and material without helical fluting and to transfer heat between the fluid circulated through such tube and the fluid surrounding such tube at a greater rate than a tube of similar size and material without helical fluting, said fluted tube providing cylindrical ends which are supported by said headers and intermediate cylindrical portions, and intermediate supports connected between said intermediate cylindrical portions and said hull to support said tube at locations between its ends.

4,040,477

HEAT RECOVERY APPARATUS

Thayne K. Garberick, 1510 Renfrew Drive, South Bend, Ind. 46614

Filed June 17, 1976, Ser. No. 697,237
Int. Cl.[2] F28D *15/00*
U.S. Cl. 165—103 **10 Claims**



1. A heat recovery apparatus comprising an exhaust gas section having a passage therethrough for connection to a source of hot gases, a blower for forcing exhaust gases from said source through said passage, a fresh air section disposed in close proximity to said exhaust gas section and having a passage therethrough for fresh air, an outlet conduit connected to said latter passage for connection to space to be heated, a blower for forcing fresh air through said latter passage into the space to be heated, a plurality of heat pipe units, each of said heat pipe units contains a plurality of heat pipes extending from one section to the other with the evaporation ends disposed in

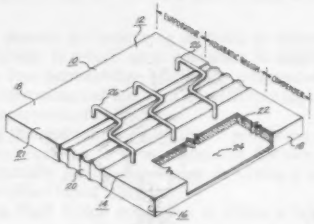
the passage of said exhaust gas section and the condensation ends being disposed in the passage of said fresh air section, the ends of the heat pipe units in the passage of the exhaust gas section being arranged in a series flow relationship and the ends of the heat pipe units in the passage of the fresh air section being arranged in a parallel flow relationship.

4,040,478

EXTERNAL TUBE ARTERY FLEXIBLE HEAT PIPE

John T. Pogson, Seattle, and Donald A. Streck, Des Moines, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Division of Ser. No. 402,655, Oct. 1, 1973, Pat. No. 3,913,665. This application June 11, 1975, Ser. No. 586,120
Int. Cl.[2] F28D *15/00*
U.S. Cl. 165—105 **6 Claims**



1. A heat pipe containing a quantity of fluid and being an airtight enclosure composite structure comprising in combination:

a. first enclosure means defining a first space and a second space, said first space containing first internal conductor means for containing and transporting the fluid therethrough as a liquid, said second space being a passageway for containing and transporting the fluid therethrough as a vapor;

b. second enclosure means operatively connected to said first enclosure means and having a flexible passageway disposed adjacent to said second space of said first enclosure means so as to allow the fluid to move from said second space of said first enclosure means into said second enclosure means as a vapor;

c. third enclosure means comprising a third space and a fourth space operatively connected to said second enclosure means, said third space containing second internal conductor means for containing and transporting the fluid therethrough as a liquid, said fourth space being a passageway disposed adjacent to said second enclosure means so as to allow the fluid to move from said second enclosure means into said fourth space of said third enclosure means as a vapor; and,

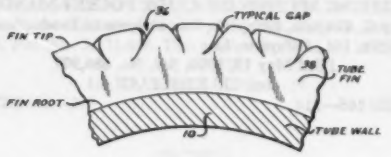
d. flexible external capillary conduit means operatively connected to said first enclosure means and to said third enclosure means, said flexible external capillary conduit means having its ends disposed adjacent to said first internal conductor means and said second internal conductor means so as to allow the fluid to move from said second internal conductor means to said first internal conductor means through said flexible external capillary conduit means, said flexible external capillary conduit means being a spring bias with respect to flexing said first enclosure means relative to said third enclosure means in one plane.

4,040,479

FINNED TUBING HAVING ENHANCED NUCLEATE BOILING SURFACE

Bonnie J. Campbell, Decatur, Ala., and Klaus R. Rieger, West Orange, N.J., assignors to UOP Inc., Des Plaines, Ill.

Filed Sept. 3, 1975, Ser. No. 610,039
Int. Cl.[2] F28F *13/18*
U.S. Cl. 165—133 **10 Claims**



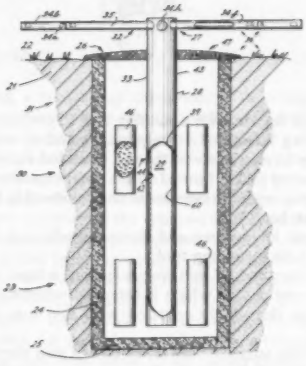
1. A heat exchanger tube comprising a tube wall having integral, radially extending fins formed in its outer surface, the tips of the fins including a plurality of fissure like transverse gaps around their peripheries, at least the majority of said gaps having a depth less than the height of the fin and a tapered width in the range from 0 to about 0.006 inches.

4,040,480

STORAGE OF RADIOACTIVE MATERIAL

Lawrence M. Richards, Monterey Park, Calif., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Apr. 15, 1976, Ser. No. 677,188
Int. Cl.[2] E21B *43/00*; F28D *15/00*; G21F *5/00*
U.S. Cl. 166—57 **4 Claims**



1. A system for storage of containers for radioactive material, said system consisting essentially of:

a. a lined subterranean well having a vertical axis extending up to a well head at about the earth's surface, there being at said well head, at least one access opening adapted to permit loading of containers into and out of the zone of said subterranean well;

b. a metal heat pipe comprising a vertically oriented heat absorption zone adapted to adsorb heat from said subterranean well, a heat dissipation zone adapted to dissipate heat to the atmosphere, a cavity extending into both the heat absorption zone and the heat dissipation zone, the walls of said heat pipe withstanding the pressure generated within said cavity by delays in heat dissipation from the heat dissipation zone, said cavity having a vapor space containing substantially only water vapor and water being the heat transfer fluid within said heat pipe, each wall of the cavity being an internal wall of said heat pipe;

c. at least one container of radioactive material in heat exchange relationship with said heat tube in the subterranean heat absorption zone;

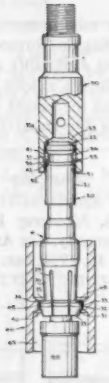
d. a closure means for the well head of the subterranean well, such closure means having a heavy weight adapted to decrease the likelihood of inadvertent or unscheduled opening of said access openings or shifting of such closure means.

4,040,481

ARRANGEMENT FOR POSITIONING A MEMBER IN A RECEIVING SECTION OF A SIDE POCKET MANDREL

Sidney G. Coussan, Lafayette, La., assignor to Production Specialties, Inc., Lafayette, La.

Filed May 17, 1976, Ser. No. 686,907
Int. Cl.[2] E21B *23/00*
U.S. Cl. 166—214 **5 Claims**



1. A latch for use with a running tool to position a member in a receiving section of a side pocket mandrel including:

a. a body having one end thereof threaded externally;

b. a threaded socket formed on the outer end of said body for engaging with the member to be positioned in the mandrel side pocket;

c. a sleeve having one end thereof configured for engagement with a running tool;

d. the other end of said sleeve having a bore therein, the innermost end of which is threaded whereby said sleeve may be threadedly engaged with said one end of said body;

e. said bore adjacent said other end of said sleeve having a plurality of longitudinally extending; circumferentially spaced slots to form a plurality of flexible portions on said other end of said sleeve; and

f. each of said flexible portions having a circumferentially extending enlargement adjacent the end thereof.

4,040,482

OPTIONAL FIRE AND RELEASE TOOL AND METHOD

Roy R. Vann, P.O. Box 38, Artesia, N. Mex. 88210

Filed June 28, 1976, Ser. No. 700,466
Int. Cl.[2] E21B *23/00, 43/119*
U.S. Cl. 166—255 **11 Claims**

5. In a well bore apparatus having a production string affixed to a packer device and extending downhole from the packer device to a perforating gun, with there being a releasable coupling member connecting the tubing together at a location between said gun and said packer, and with said gun having a firing head which is located within the interior of said tubing, the combination with said firing head and releasable coupling of a firing and releasing tool;

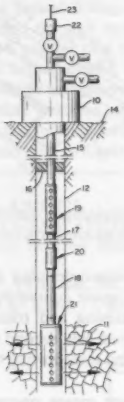
said firing and releasing tool having a main body, a plurality of circumferentially extending dogs, and a retractable member which is connected to and downwardly extends from said main body; means mounting said dogs to said main body in such a manner that said dogs can be retracted into said main body to thereby permit uphole movement of the tool;

a stop means positioned above said releasable coupling for engaging said dogs and arresting uphole movement of said tool;

said releasable coupling having a releasing member therein for engaging said dogs so that the dogs of the tool can engage and move the releasing member when the tool is moved uphole;

the distance measured from said releasable coupling to said gun head being shorter than the distance measured between said dogs and the lowermost end of said tool when the retractable member is extended, and being greater when the retractable member is retracted;

so that said tool can be run downhole and touch bottom, with the dogs being located at an elevation which is intermediate said stop means and said releasable coupling, whereupon the tool can then be picked up so that the dogs engage said stop means to thereby determine the distance from the bottom of the hole to the stop means;



and thereafter said tool can be run downhole to engage the firing head, or alternatively, the dogs can be retracted and the tool brought back to the surface of the ground.

9. The method of completing a well bore comprising the steps of:

locating a perforating gun downhole on the end of a tubing string and connecting the tubing string together with a releasable coupling device;

placing a stop means in spaced relationship above said releasable coupling device;

measuring the distance from said perforating gun to said stop means;

running a firing tool downhole within the tubing string and touching bottom above the gun;

lifting the firing tool uphole and engaging said stop means to measure the spaced distance between said bottom and said stop means;

comparing the last measurement to the first measurement;

firing the gun and subsequently releasing the releasable coupling member when the first and last measurements are equal to one another;

removing the firing tool from the tubing string when the first and last measurements are unequal.

4,040,483

RECOVERY OF OIL BY CIRCULATING HOT FLUID THROUGH A GAS-FILLED PORTION OF A NETWORK INTERCONNECTED FRACTURES

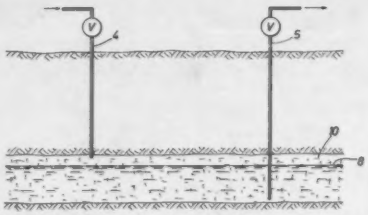
Jan Offeringa, Rijswijk, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 571,463, April 25, 1975, abandoned, and Ser. No. 586,106, June 11, 1975, abandoned. This application Jan. 9, 1976, Ser. No. 647,947

Claims priority, application United Kingdom, June 4, 1974, 24681/74; Mar. 14, 1975, 10730/75

Int. Cl.[2] E21B *43/25*

U.S. Cl. 166—272 10 Claims



1. In a process for producing oil from an extensively fractured reservoir in which oil is contained in matrix blocks of relatively low permeability which are surrounded by a network of interconnected fractures of relatively high permeability, the improvement comprising:

treating the reservoir by injecting or producing fluid to the extent necessary to form within the fracture network a substantially gas-filled gas layer overlying a substantially liquid-filled liquid layer;

injecting fluid which comprises or forms a hot fluid in a manner such that hot fluid flows into the gas layer, flows along the exposed faces of the matrix blocks, heats oil contained in the matrix blocks, and causes heated oil to be displaced into the fracture network;

producing an oil-containing liquid from within the liquid layer in the fracture network; and

correlating the rates and locations of the injections and productions of fluid so that the interface between the gas and liquid layers in the fracture network is kept at selected depths within the network of fractures.

4,040,484

GEL FORMATION BY POLYMER CROSSLINKING

James E. Hessert, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Nov. 6, 1975, Ser. No. 629,360

Int. Cl.[2] E21B *33/138*

U.S. Cl. 166—294 10 Claims

1. A composition capable of forming a gel for treating underground formations at a slow rate of gelling by crosslinking, said composition consisting essentially of gel forming amounts of:

a. water;

b. a water thickening amount of a water dispersible polymer selected from among the group consisting of substantially linear homopolymers and copolymers of acrylamide and methacrylamide, cellulose ethers, and heteropolysaccharides produced by fermentation of carbohydrates by bacteria of the genus Xanthomonas, said polymer capable of being crosslinked by polyvalent metal cations;

c. a polyvalent metal component chosen from the group consisting of hexavalent chromium compounds and heptavalent manganese compounds in a reducible oxidation state; and

d. a reducing agent selected from among the group consisting of $MnCl_2$, KI, $K_4Fe(CN)_6$ and $Mn(NO_3)_2$.

10. A method for at least partially plugging porous portions of an underground formation comprising injecting into said formation a composition of claim 1 and allowing said composition to produce a gel.

4,040,485

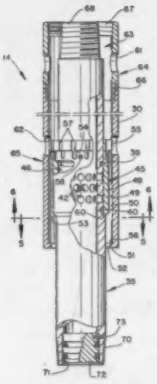
METHOD OF SIMULTANEOUSLY SETTING A PACKER DEVICE AND ACTUATING A VENT ASSEMBLY

Roy R. Vann, and Flint R. George, both of Artesia, N. Mex., assignors to Vann Tool Company, Inc., Artesia, N. Mex.

Division of Ser. No. 517,390, Oct. 23, 1974, Pat. No. 3,931,855, which is a continuation-in-part of Ser. No. 382,958, July 26, 1973, Pat. No. 3,871,448. This application Jan. 12, 1976, Ser. No. 648,470

Int. Cl.[2] E21B *33/129, 43/11*

U.S. Cl. 166—297 14 Claims



1. The method of completing a well bore comprising the steps of:

assembling a tool string comprised of a tubing string, a packer device, and a vent assembly; attaching the vent assembly in underlying relation respective to the packer device and attaching the packer device to one end of the tubing string;

connecting an extension from the packer mandrel to the vent assembly and moving the vent assembly from the closed to the opened position in response to said packer mandrel being moved from the unset to the set position;

running the tool string downhole into the borehole such that both the packer device and vent assembly are positioned at a location which is above a production formation associated with the well bore, with the tubing string extending from the well head down to the packer device;

setting the packer device while simultaneously actuating the vent assembly to the opened configuration so that flow can occur up the lower borehole annulus, into the vent assembly, into the tubing string, and out of the well head.

4,040,486

METHOD AND APPARATUS FOR AIR DEVELOPMENT AND REJUVENATION OF WATER WELLS

Joe D. Kirkland, Jr., Amarillo, Tex., assignor to Steve Taylor, Amarillo, Tex., a part interest

Filed May 10, 1976, Ser. No. 685,081

Int. Cl.[2] E21B *37/00, 43/00, 43/25*

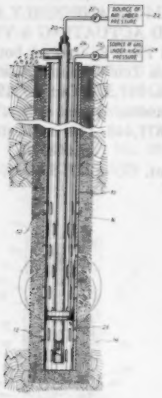
U.S. Cl. 166—311 25 Claims

1. The method of developing a water well having an eduction tube comprising: periodically jetting slugs of high velocity air from within the well outward in all horizontal directions, and while jetting air also continuously producing enough water from the bottom of the well by the eduction tube to remove all silt and debris therefrom.

19. In a water well having

a. an eduction tube in

b. a well bore,
c. the improved structure comprising:
d. a jet ring adapted to surround the eduction tube within the well bore,



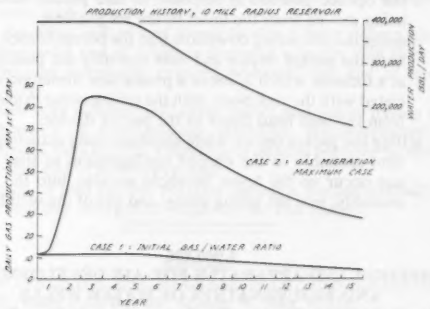
c. said jet ring forming means for jetting air at high velocity in all horizontal directions,
f. a source of high pressure air on the surface of the ground, and
g. a conduit from the source of air to the jet ring.

4,040,487

METHOD FOR INCREASING THE RECOVERY OF NATURAL GAS FROM A GEO-PRESSURED AQUIFER

Harold L. Cook, Jr.; Ernest C. Geer, both of Houston, Tex., and Donald L. Katz, Ann Arbor, Mich., assignors to Transco Energy Company, Houston, Tex.

Continuation-in-part of Ser. No. 589,240, June 23, 1975, abandoned. This application May 24, 1976, Ser. No. 689,621
Int. Cl.² E21B *43/00*
U.S. Cl. 166—314 **8 Claims**


PRODUCTION HISTORY, 10 MILE RADIUS RESERVOIR
400,000
300,000
200,000
WATER PRODUCTION BBL / DAY
CASE 2 : GAS MIGRATION MAXIMUM CASE
CASE 1 : INITIAL GAS / WATER RATIO
DAILY GAS PRODUCTION, MMSCF / DAY
YEAR

1. A method of increasing the recovery of natural gas from a watered-out geo-pressured natural gas reservoir containing water, gas in solution in the water, a zone of free gas dispersed in the water, a free-gas phase, and which includes one or more wells completed in said zone in the

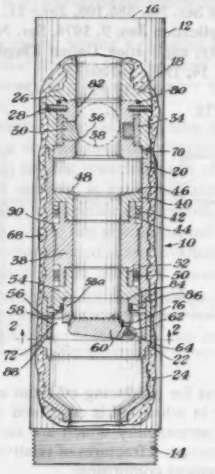
producing water from the wells under reservoir pressure, at a high enough rate of production to reduce the existing bottomhole pressure of the wells to effect the recovery of more than one form of natural gas from the reservoir by causing the natural gas to expand sufficiently so as to migrate more freely to the wells and be produced.

4,040,488

DIFFERENTIAL VALVE

Wayne F. Nelson, Wichita Falls, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Sept. 27, 1976, Ser. No. 727,074
Int. Cl.² E21B *43/00*
U.S. Cl. 166—317 **6 Claims**



1. Differential valve apparatus comprising within an elongated multisection inner casing having upper and lower ends, a dog retainer section, a piston section and a check valve and flow port section;

said casing having an axial bore extending therethrough, said bore having a larger diameter section intermediate of its ends,

said dog retainer section having an axial bore extending therethrough and fitting slidably within the upper part of said bore in said casing with an outwardly flanged part at its lower end which is being disposed in the larger diameter section of said casing bore, but is held in fixed position by shearable means, said dog retainer section having a retractable ball retaining means extending through its side walls and retained in place by circumferentially expandable detent means, said piston section having an axial bore extending therethrough, an upper end and a lower end, the upper end part of said piston section being of larger diameter than the remainder thereof, said upper end of said piston section being disposed in the larger diameter part of said casing bore, a pair of spaced apart seals, each seal extending around said piston section, said lower end of said piston section which is subject to pressure from below having an area less than the upper end of said section and having a wall seal containing counterbored part for sealing with a tubular walled part of said check valve and flow port section, said check valve and flow part section comprising a tubular outer part and a tubular walled inner part joined by wall sections surrounding axially disposed flow ports, said tubular walled inner part having a valve seat and check valve at its lower end, said check valve and flow port section being disposed for limited sliding movement within said casing.

4,040,489

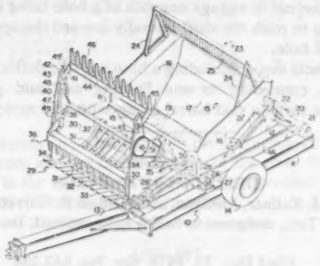
ROCK PICKER

Leslie Hulicsko, 1421-7th Avenue, Regina, Canada

Filed Jan. 30, 1976, Ser. No. 654,056
Claims priority, application Canada, June 4, 1975, 228661
Int. Cl.² A01B *43/00*
U.S. Cl. 171—63 **14 Claims**

1. A rock picker comprising in combination a supporting

frame, a stone bucket in said frame, ground engaging wheels mounted on said frame, a prong assembly mounted within said frame, means mounting said prong assembly for raising and lowering same relative to the ground, a rotary rake assembly mounted in said frame above said prong assembly, and power means operatively connected to said rotary rake assembly for rotating same at varying speeds and in either direction, said rotary rake assembly cooperating with said prong assembly to move stones from said prong assembly into said stone bucket, said rotary rake comprising a cross shaft journalled for rotation in said frame above said prong assembly, at least two sets of



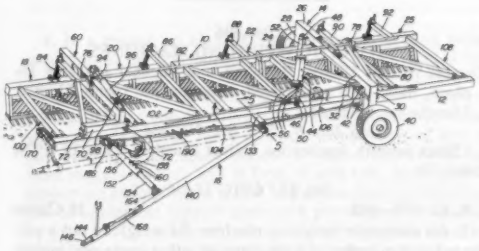
raking teeth mounted diametrically upon said shaft, means mounting said teeth upon said shaft, said last mentioned means including a pair of side flanges secured one to adjacent each end of said shaft, stop means on said side flanges adjacent each end thereof, a mounting member pivoted by one end thereof to adjacent each end of said side flanges, a cross bar extending between the other ends of the corresponding mounting members of said side flanges, and a plurality of stone picking teeth secured to and extending from said cross bar, and tension spring means extending between said mounting member and said side flanges normally urging said mounting member against said stop means.

4,040,490

ROCK WINDROWER

Raymond R. Anderson, Ray, N. Dak. 58849

Filed Mar. 8, 1976, Ser. No. 665,100
Int. Cl.[2] A01B *43/00*
U.S. Cl. 171—63 **9 Claims**



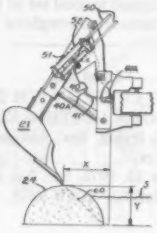
1. A windrower including an elongated main frame having front and rear ends, a rear transverse axle assembly, first support means supporting said axle assembly from said frame for adjustable angular displacement in a horizontal plane relative to said frame, front towing means supported from said frame for adjustable shifting transversely thereof operative in conjunction with adjustment of said axle assembly to establish an angularly adjustable towed relationship of said frame relative to the path of movement of said windrower as the latter is towed behind a towing vehicle to which towing means is attached, said frame including longitudinally extending transversely facing rake means.

4,040,491

AUTOMATIC RESET PLOW

William J. Dietrich, Congerville, Ill., assignor to DMI, Inc., Goodfield, Ill.

Filed Aug. 15, 1975, Ser. No. 605,160
Int. Cl.[2] A01B *61/04*
U.S. Cl. 172—269 **9 Claims**



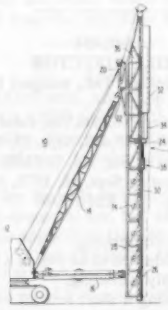
1. An automatic reset plow comprising: a linkage assembly connected at a forward position to a draft member; a plow bottom carried by said linkage assembly; cam means comprising a cam member defining a cam surface having first and second portions and a cam follower engaging said first portion of said cam surface when said plow is in a normal plowing position and adapted to engage said second portion of said cam surface when said plow is raised from a normal plowing position; and resilient means connected between said cam means and said linkage assembly for urging said cam surface into engagement with said cam follower and for urging said plow bottom in the plowing position; whereby said cam member and cam follower remain engaged during raising and reset of said plow and the shape of said second portion of said cam surface controls the reset force on said plow.

4,040,492

MODULAR LEADS FRAME WITH NOISE ABATEMENT SYSTEM AND PILE FEEDER

Leonard L. Frederick, 15 Crestview Terrace, Whippany, N.J. 07981

Division of Ser. No. 359,782, May 14, 1973, Pat. No. 3,887,017, which is a continuation-in-part of Ser. No. 142,173, May 11, 1971, Pat. No. 3,747,689. This application Oct. 23, 1974, Ser. No. 517,153
Int. Cl.[2] E02D *7/06*
U.S. Cl. 173—1 **2 Claims**



1. A method of abating noise in a pile driving machine when operating to drive a pile, the machine including a boom, a leads

frame operatively associated therewith and a pile driving hammer, with the leads frame extending substantially the full length of the undriven pile, the method comprising the steps of:

a. fixedly mounting a first set of noise abating means to the leads frame, along the full extent thereof;

b. mounting a second set of noise abating means to the leads frame in approximate location with the driving hammer for displacement along the leads frame with the driving hammer;

c. moving certain ones of the second set of noise abating means relative to other ones thereof to establish an overlapping relationship therebetween; and

d. moving the overlapped second set of noise abating means with the driving hammer throughout its driving range.

4,040,493

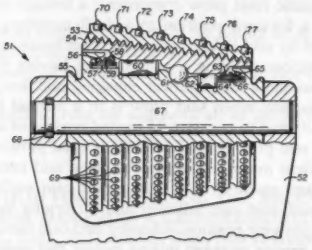
ROCK BORING CUTTER WITH THREAD-ON REPLACEABLE CUTTING ELEMENT

William Craig Saxman, Irving, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed May 13, 1976, Ser. No. 685,838

Int. Cl.[2] E21B 9/08

U.S. Cl. 175—374 **2 Claims**



1. A cutter apparatus for earth boring, comprising:

a saddle having a pair of support arms;

a bearing shell mounted between said support arms;

an inner cutter shell mounted for rotation about said bearing shell, said inner cutter shell having a generally tapered conical exterior surface;

threads on said generally tapered conical exterior surface of said inner cutter shell;

an outer cutter shell mounted over said inner cutter shell, said outer cutter shell having an outer surface and a central passage, said central passage having a conical surface;

threads on said conical surface of said central passage that engage the threads on said generally tapered conical exterior surface of said inner cutter shell; and

a multiplicity of carbide inserts mounted in said outer surface of said outer cutter shell.

4,040,494

DRILL DIRECTOR

Jackson M. Kellner, Midland, Tex., assignor to Smith International, Inc., Midland, Tex.

Continuation-in-part of Ser. No. 584,736, June 9, 1975, which is a continuation of Ser. No. 505,450, Sept. 13, 1974, abandoned, which is a continuation of Ser. No. 419,106, Nov. 26, 1973, abandoned. This application Sept. 15, 1975, Ser. No. 613,060

Int. Cl.[2] E21B 7/04

U.S. Cl. 175—45 **19 Claims**

1. Drilling apparatus comprising

an in-hole assembly adapted to be run in a hole being made, said in-hole assembly including,

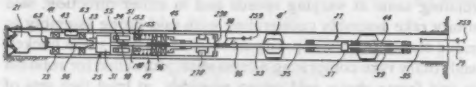
an in-hole motor having a shaft rotated when the motor is actuated, said shaft being adapted to rotate a drill bit,

a deflection barrel rotatable about the shaft axis,

positioning means for turning the barrel to a desired azimuthal position relative to the axis of rotation of the motor shaft and holding it in that position, said positioning means including a single hydraulic line for actuation, and

said apparatus further comprising

command means for directing said positioning means through said single hydraulic line,



said deflection barrel including means extendable from the side thereof to engage one side of a hole being drilled and means to push the shaft laterally toward the opposite side of the hole,

said in-hole motor including a housing, said deflection barrel being connected to said housing and said positioning means turning said barrel along with said motor housing.

4,040,495

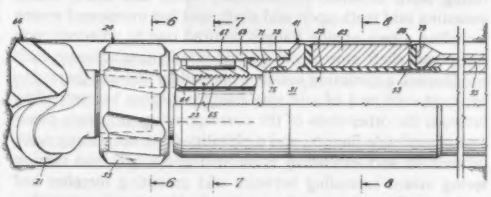
DRILLING APPARATUS

Jackson M. Kellner, Midland, and William R. Garrett, Houston, both of Tex., assignors to Smith International, Inc., Midland, Tex.

Filed Dec. 22, 1975, Ser. No. 643,254

Int. Cl.[2] E21B 7/08, 3/12

U.S. Cl. 175—73 **25 Claims**



1. Earth boring apparatus comprising

a string of pipe,

an in-hole motor having a stator affixed to one end of said pipe string, and

a deflection means affixed to said pipe string,

said deflection means comprising a barrel disposed about said motor stator, one end of said barrel being connected to said one end of said pipe string, and means at an other portion of said barrel for engaging an outer peripheral portion of said motor shaft.

4,040,496

AUTOMATIC WEIGHING MACHINES

Thomas William Wilson, Bramhall, and Michael Johnston Topham, Sale, both of England, assignors to Tootal Limited, Manchester, England

Filed June 9, 1975, Ser. No. 584,842

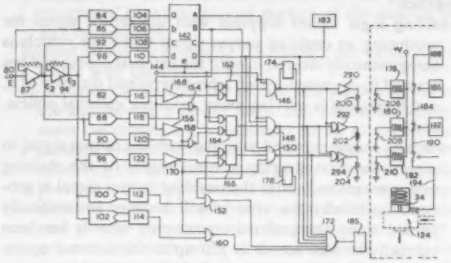
Claims priority, application United Kingdom, June 18, 1974, 26862/74

Int. Cl.[2] G01G 13/04

U.S. Cl. 177—105 **10 Claims**

1. An automatic weighing machine for weighing out a predetermined quantity of fluid material into a container, including a fluid material valve of the downward delivery type comprising a closure member having a plurality of selectable discrete positions corresponding to different predetermined flow rates through the valve, and a weighing control system which is adapted to control the valve so as to dispense an appropriate weight of fluid material into the container in accordance with a predetermined program, the control system comprising load cell means arranged to provide an electrical output dependent upon the weight of the container plus its contents, and a comparator for comparing the signal from said load cell means with a predetermined target weight to be

achieved in accordance with the program to provide an electrical error signal instantaneously representative of the additional weight of fluid material to be dispensed and dynamic



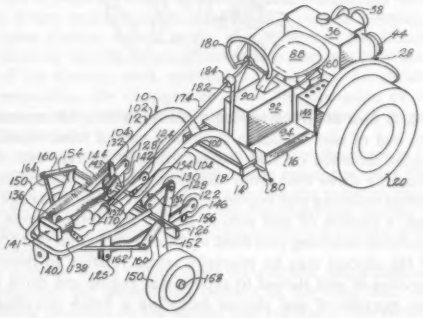
detector means responsive to both the magnitude of the instantaneous error and the rate of change of the error for initiating a change in the valve from a positive flow position to OFF in advance of the error reducing to zero.

4,040,497

TRACTOR

Harold D. Thomas, Cumming, Ga., assignor to Tri Tractor Manufacturing Co., Inc., Cummings, Ga.

Filed Aug. 11, 1975, Ser. No. 603,742
Int. Cl.[2] B60K *17/28*
U.S. Cl. 180—53 R **12 Claims**



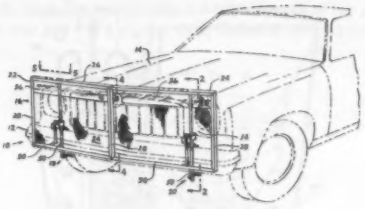
1. In a tractor, an elongated tractor frame, driving wheels mounted on the rear portion of said frame and front wheels steerably mounted on the forward portion of said frame, means for steering said front wheels, an engine mounted on the rear portion of said frame for driving said rear wheels, an operator's seat mounted on said frame positioned forwardly of said engine, an implement space defined by said frame behind said front steerable wheels and in front of said seat, and means for supporting an implement in said implement space comprising a pair of implement support arms each pivotally mounted at its forward end on said frame in front of said implement space and extending rearwardly toward said implement space for supporting an implement in said implement space a lever system for pivoting said implement support arms upwardly and downwardly about their forward ends comprising a pair of connecting arms each connected at one of its ends to an intermediate portion of one of said implement support arms, a control rod extending across the length of said frame and supported at its ends on said frame and including levers extending rearwardly therefrom and connected to said connecting rods, a pivoted shifting lever mounted on said control rod and arranged to pivot said levers about said control rod, and power operated means mounted on said frame and arranged to pivot said pivoted shifting lever, whereby the power operated means actuates the lever system to cause said implement support arms to pivot upwardly and downwardly about their forward ends and raise and lower the implement carried thereby.

4,040,498

INSECT SHIELD ASSEMBLY

James B. Johnson, and Jesse L. Henson, both of Urbana, Ohio, assignors to W. B. Marvin Mfg. Co., Urbana, Ohio

Filed Nov. 6, 1975, Ser. No. 629,376
Int. Cl.[2] B60K *11/02*
U.S. Cl. 180—68 P **6 Claims**



1. An insect shield assembly comprising:

a shield including a peripheral frame structure having an upper portion and a lower portion; and

means for removably mounting said shield on a vehicle, said means comprising:

a pair of mounting members, means for removably mounting said mounting members on the front of a vehicle, said mounting members when mounted on the front of the vehicle having generally vertically extending parts projecting above said

means for removably mounting them on a vehicle; and

a pair of brace means, one for each mounting member, each of said brace means comprising a first generally vertical brace member connected to said upper portion of said frame structure,

a second generally vertical brace member connected to said lower portion of said frame structure, said brace memers having adjacent, offset end portions, and

clamp means interconnecting said end portions, the lowermost ends of said first brace members being telescopically interengaged with said generally vertically extending parts for orienting said shield in a generally vertical position in front of the vehicle, said clamp means having surfaces engaging said mounting members to limit the length of interengagement of said first brace members and said generally vertically extending parts and to provide support for said shield, so that said shield and said brace means may be mounted on and removed from the vehicle as a single unit.

4,040,499

VEHICLE CONTROL ARMREST IN A VIBRATION ISOLATED CONTROL MODULE

Anthony M. Kestian, Berwyn, and Raymond J. Allori, Chicago, both of Ill., assignors to International Harvester Company, Chicago, Ill.

Division of Ser. No. 571,442, April 25, 1975, which is a continuation-in-part of Ser. No. 432,799, Jan. 11, 1974, abandoned. This application Dec. 10, 1975, Ser. No. 639,564
Int. Cl.[2] B60K *23/00*
U.S. Cl. 180—77 R **4 Claims**

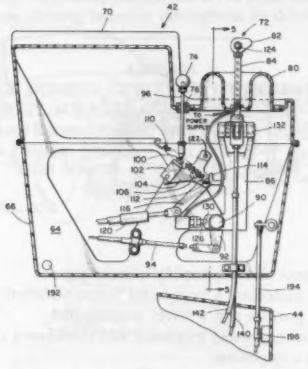
1. An armrest control for use in a vehicle having controllable equipment, the armrest control comprising:

a podium carried in the vehicle, the podium having an inclined uppermost surface sloping from the rear of the podium toward the front of the podium, a pivot point

means appended to the rear uppermost surface of the podium,

a housing pivotally mounted to the uppermost surface of the podium, the housing containing a frame structure provided with a housing pivoting means that is accommodated by the pivot point means of the podium;

a push-pull shielded cable affixed at one end to the frame structure in said housing, passing out of the housing into the podium wherein the shielding of the cable is securely affixed to the podium, movement of the push-pull cable responsive to the pivotal movement of the housing;



a control stick pivotally mounted to the frame structure inside the housing displaceable in planes perpendicular as well as parallel to the axis of pivotal mounting of the housing;

a second push-pull cable (94) attached to the control stick communicating movement of the control stick in a plane perpendicular to the axis of pivotal mounting of the housing to the vehicle; and

first and second steering push-pull cables mounted to the control stick communicating movement of the control stick in a plane perpendicular to the axis of pivotal mounting of the housing to the vehicle.

4,040,500

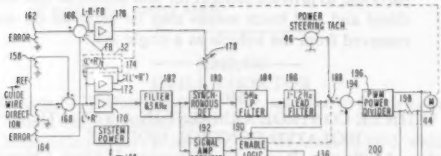
GUIDANCE SYSTEM FOR LIFT TRUCK

Thomas R. Blakeslee, Woodside, Calif., assignor to Logisticon, Inc., Sunnyvale, Calif.

Filed Nov. 6, 1975, Ser. No. 629,491

Int. Cl.[2] B62D *1/24*

U.S. Cl. 180—98 **6 Claims**



1. An improved, self-guided vehicle of the type which automatically follows an externally defined course and which has at least one ground engaging steering wheel, sensor means mounted on the vehicle for generating a sensor signal representative of both the lateral position of the vehicle with respect to the course and the direction of vehicle travel with respect to the course, steering motor means attached to the ground engaging steering wheel for steering the vehicle in response to a steering control signal to the steering motor means, and steering circuit means supplied with the sensor signal for generating a first steering control signal for the steering motor means to cause the steering motor means to automatically steer the vehicle along the external course, wherein the improvement comprises:

enabling logic means supplied with the sensor signal for producing an enabling output signal when the vehicle is being manually steered toward the external course and has crossed it, or passed within a predetermined distance of it, and thereafter is moving away from the external course, and

switching means supplied with the enabling output signal to supply the first steering control signal to the steering motor means only after the enabling output signal is generated, whereby the vehicle will become automatically guided along the external course only after it has been manually steered across or just up to the external course and is starting to move away from it.

4,040,501

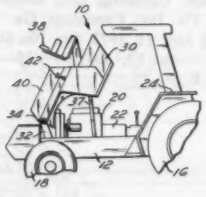
LIFT TRUCK

John W. Haswell, 44429 Harmony Lane, Belleville, Mich. 48111

Filed Apr. 26, 1976, Ser. No. 680,193

Int. Cl.[2] B62D *25/10*

U.S. Cl. 180—89.18 **2 Claims**



1. A fork lift truck having a chassis, a fork lift mounted at one end of said chassis in front of a pair of front wheels, an engine mounted on said chassis adjacent the rear end of the chassis, a drive train from said engine to said front wheels, a shroud covering said engine and said drive train, one edge of at least a portion of said shroud having apertures therein, said apertures receiving pins fixed to the chassis so that said portion of the shroud may be pivotally raised relative to remaining portions of said shroud to expose said engine and drive train, said portion of said shroud including a hatch covering the engine, one edge of said hatch having apertures therein, said apertures receiving said pins fixed to the chassis so that said hatch may be opened to expose only said engine.

4,040,502

HYDRAULIC POWER STEERING

Hiroshi Yoshida, Toyokawa; Hajime Kozuka; Toyoshi Sakano, both of Okazaki; Yoichiro Honda, Kasugai, and Shojiro Omuro, Nagoya, all of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha and Mitsubishi Jukogyo Kabushiki Kaisha, both of, Japan

Filed July 23, 1975, Ser. No. 598,402

Claims priority, application Japan, July 24, 1974, 49-88848[U]

Int. Cl.[2] B62D *5/06*

U.S. Cl. 180—149 **7 Claims**

1. A hydraulic power steering system, comprising:

a drag link having first and second end portions disposed respectively on first and second side portions of a vehicle;

a steering shaft for the vehicle disposed on the first side portion and having an end portion adjacent the first end portion of the drag link;

a steering gear box interposed between the end portion of the steering shaft and the first end portion of the drag link

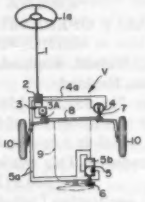
and mounted on the first side portion of the vehicle, the gear box having a pitman arm for displacing the drag link laterally of the vehicle to steer the vehicle if a steering input is applied to the steering shaft;

a changeover valve disposed on the first side portion and interposed between the end portion of the steering shaft and the gearbox;

control means for operating the changeover valve in accordance with the steering input;

an actuator disposed on the second side portion of the vehicle and having a power assist arm rotatable thereby to assist the pitman arm's displacing of the drag link; and

a pressure system controlled by the changeover valve for operating the actuator, which pressure system includes a pressure source, a pressure sink, and rotary passage means disposed on the first side portion and defining a first pressure passage to interconnect the pressure source and the pressure sink with ports of the changeover valve, and a second pressure passage to interconnect other ports of the



changeover valve with the actuator for operating the actuator and thereby the power assist arm and the drag link in response to the operating of the changeover valve,

the rotary passage means comprising a control housing, a rotor therein, means at the end portion of the steering shaft for thereby rotating the rotor in response to rotation of the steering shaft, and means in the rotor for slidably supporting the changeover valve for operation of the valve, independent of the rotating of the rotor, to control the actuator;

the pressure system also including pressure chambers in the control housing, at both ends of the rotor, the rotor having a passage therein, interconnecting the pressure chambers to equalize pressures in the chambers and thereby to facilitate the rotating of the rotor by the end portion of the steering shaft;

the actuator being remote from the gearbox, being disposed adjacent the second end portion of the drag link, and being mounted on the second side portion of the vehicle, independently of the gearbox.

4,040,503

HORN SPEAKER

Masanori Hino, Hirakata; Taro Eguchi, Osaka, and Chitoshi Shiraga, Yagumo, all of Japan, assignors to Onkyo Kabushiki Kaisha, Japan

Division of Ser. No. 432,879, Jan. 14, 1974, Pat. No. 3,972,385. This application May 10, 1976, Ser. No. 684,928

Claims priority, application Japan, Jan. 17, 1973, 48-8056; Jan. 17, 1973, 48-8057; Mar. 10, 1973, 48-28438; Mar. 19, 1973, 48-31574

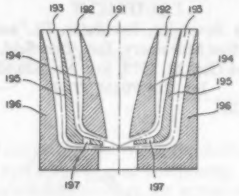
Int. Cl.[2] G10K *11/00*

U.S. Cl. 181—192 **1 Claim**

1. A horn speaker comprising a diaphragm, a side wall, and at least one interior sound partition, forming at least two passages for radiating sound waves emitted from the diaphragm, the horn speaker having a substantially straight principal horn axis and a generally planar mouth surface positioned substantially in parallel to the inlet face of the horn, the area of each sound passage in section taken along a plane perpendicular to the principal horn axis increasing continuously at a substantially constant rate of area expansion from a throat to the plane of the mouth in the direction of the principal horn axis, the horn speaker being characterized in that said at least one interior sound partion has inner and outer surfaces, at least said outer surface being curved along the principal horn axis to give substantially the relationship for each sound passage represented by the equation:

$$l = -f + \sqrt{(l_0 + f)^2 + y^2}$$

wherein l is the effective length of the sound passage for propagating sound waves from the diaphragm to a point at a distance of y from the intersection of the principal horn axis with the mouth plane, the point being positioned on at least one first straight directional line contained in the mouth plane and passing through the intersection, l o is the length of the principal horn axis and f is a virtual focal distance; and wherein:



the mouth surface is generally circular, and every diametrical direction of the plane of the mouth substantially coincides with the directional line;

said at least one interior sound partition, as seen in cross section parallel to the mouth plane, is annular in shape and coaxial with the principal horn axis, whereby said at least two sound passages defined by said at least one interior sound partition and the side wall, as seen in cross section parallel to the mouth plane, include a circular sound passage coaxial with the principal horn axis and at least one annular sound passage concentric with the circular sound passage; and

at least one of said at least one interior sound partition defines a plurality of circumferentially spaced bores, or passageways, through the sound partition.

4,040,504

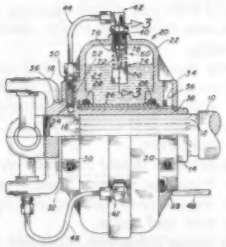
DRIVE SHAFT U-JOINT LUBRICATOR

Roy B. Smith, 3480 NE. 62, Washington Court House, Ohio 43160

Filed Nov. 26, 1975, Ser. No. 635,439

Int. Cl.[2] F01M *9/00*

U.S. Cl. 184—1 E **1 Claim**



1. A method of mounting lubricating apparatus on the drive shaft of a previously assembled commercial vehicle, said drive shaft having an end with longitudinally extending splines on the periphery, said splines extending only part of the length of the shaft, a yoke mounted on the shaft and having mating internal splines, said yoke comprising part of a universal joint; comprising in sequence,

first disconnecting said universal joint and removing the yoke from the shaft,

second sliding an annular dynamically balanced lubricant reservoir over the shaft past the splines,

third reattaching the yoke and shaft in operable position with the splines again mating,

fourth rigidly attaching said reservoir to said shaft and yoke combination, and

fifth attaching conduits to said yoke and reservoir to conduit lubricant from said reservoir to said yoke,

providing means within said reservoir prior to its assembly on the shaft to force lubricant from said reservoir into said conduits upon rotation of said shaft.

4,040,505

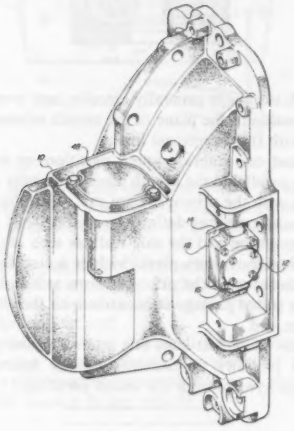
LUBRICATION SYSTEM FOR EARTH MOVING EQUIPMENT

Thomas Anthony Beveridge, Rochester, Ill., assignor to Fiat-Allis Construction Machinery, Inc., Deerfield, Ill.

Filed Oct. 29, 1975, Ser. No. 626,650

Int. Cl.[2] F01M *11/00*

U.S. Cl. 184—6.28 **1 Claim**



1. A lubrication system for earthmoving equipment of the type having a final drive enclosed in a closed housing which forms a lubricant sump and has lubricant lines interior thereof for directing lubricant to lubrication points, said closed housing having an access opening located on a side thereof above the level of the lubricant in said sump, said final drive including a lubricant pump drive gear means operable with said final drive and aligned with said access opening, comprising

removable access cover means for sealingly closing said access opening,

lubricant pump means assessmbled and secured to the exterior of said access cover means and adapted to be removed from said access cover means without removing said cover means from said access opening and being removable, with said cover,

filter means assembled in said access cover means so as to be removable from the exterior thereof without removing said cover means from said access opening and being removable with said cover,

lubricant line means comprising inlet line means, pump inlet line means, pump and filter interconnecting line means and discharge line means, said inlet line means depending downward from the interior of cover-means and terminating in an inlet screen means below the level of the lubricant in said sump, said pump inlet line means being assembled and secured to the interior of said cover means and connecting said inlet line means to the inlet port of said lubricant pump means, said interconnecting line means being secured to the interior of said cover means between the inlet of said filter means and the outlet port of said lubricant pump means, said discharge line means being assembled and secured to the interior of said cover means and connecting the outlet of said filter means to discharge coupling means whereby when said access cover means is assembled to said access opening said lubricant pump means is connected at its inlet to said lubricant sump, the inlet of said filter means being connected to the output of said lubricant pump means and the outlet of said filter means is connected through said discharge coupling means to said lubrication points, and

drive means for connecting said lubricant pump means to said lubricant pump drive gear means, whereby each time said drive means is operated said lubricant pump means withdraws lubricant from said lubricant sump and directs it through said lubricant lines means and said filter means to said lubrication points.

4,040,506

HYDRAULICALLY OPERATED DISC BRAKES FOR VEHICLES

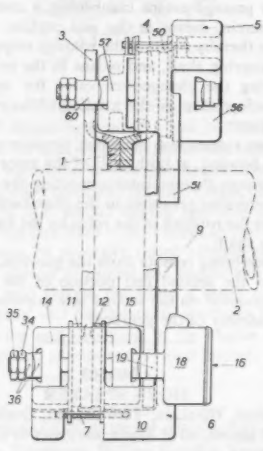
Charles Newstead, Walsall, England, assignor to Girling Limited, Birmingham, England

Division of Ser. No. 559,591, March 18, 1975, Pat. No. 3,966,025, which is a continuation of Ser. No. 464,222, April 25, 1974, abandoned, which is a continuation of Ser. No. 170,254, Aug. 9, 1971, abandoned. This application Feb. 24, 1976, Ser. No. 660,973

Claims priority, application United Kingdom, Aug. 21, 1970, 40275/70

Int. Cl.[2] F16D *55/228*

U.S. Cl. 188—72.5 **7 Claims**



1. A disc brake assembly for a vehicle including a first axially fixed outboard rotatable disc, a second axially fixed inboard rotatable disc rotatable with and spaced axially from said first disc, in an inborad direction, each disc having an inner face, an outer face, a radially innermost peripheral edge from which said disc is driven, and a free radially outermost peripheral edge, said inner face of said first outboard disc facing said inner face of said second inboard disc and said outer face of each disc facing outwardly away from the other disc, a first pair of friction pads for engagement with said inner and said outer faces of said first outboard disc, a second pair of friction pads for engagement with said inner and said outer faces of said second inboard disc, first and second fluid-pressure operated actuators for applying said first and second pairs of friction pads to said inner and outer faces of each respective said first and second disc, said first and second actuators being both

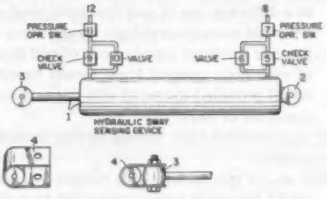
located adjacent to said outer face of said second inboard disc, a first pair of inner and outer axially movable pressure plates for urging said first pair of friction pads into engagement with said inner and outer faces of said first outboard disc, a second pair of inner and outer axially movable pressure plates associated with said second pair of friction pads, said second actuator comprising means for axially moving said second pair of inner and outer pressure plates and for urging said second pair of friction pads into engagement with said inner and outer faces of said second inboard disc and including an applying portion extending over said outermost peripheral edge of said inboard disc and wherein said first actuator comprises a pair of circumferentially spaced hydraulic cylinders, a piston working in each hydraulic cylinder, a co-axial tubular portion carried by each cylinder, extending over said outermost peripheral edge of second inboard disc, and acting on said inner pressure plate of said first pair to apply an adjacent friction pad to said inner face of said first disc, and a draw-bar guided through each tubular portion and through which said last mentioned piston acts on said outer pressure plate of said first pair to apply the other friction pad of said first pair to said outer face of said first disc, both said pressure plates of said first pair lying on a first common chord passing through the centers of pressure of said first pads, and including a first stationary member straddling the outermost peripheral edge of said first outboard disc and extending over said outermost peripheral edge of said inboard disc, said first stationary member having a gap in which said first pair of friction pads are located and are guided for movement towards and away from said first disc, and said stationary member also having circumferentially spaced openings through which said draw-bars of said first actuator are slidably guided, and a relatively stationary part adjacent to said outer face of said inboard disc, and to which said first stationary member is secured.

4,040,507

AUTOMATIC TRAILER SWAY SENSING AND BRAKE APPLYING SYSTEM

Herman A. Reise, 513B Portsmouth Drive, Lakewood, N.J. 08701

Filed Nov. 6, 1975, Ser. No. 629,603
Int. Cl.[2] B60T *7/20*
U.S. Cl. 188—112 **1 Claim**



1. A sway control system for controlling brakes of a towed vehicle in response to the detection of a sway condition comprising:

a hydraulic unit having first and second ends mounted to coupling means between the towed vehicle and a towing vehicle, which hydraulic unit includes first and second fluid passages associated with said first and second ends of the unit each passage including a check valve shunted by a bypass restricted orifice and a pressure switch, and

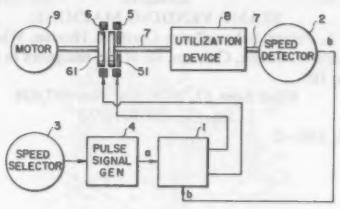
an electric brake circuit for applying and releasing the brakes of the towed vehicle in response to said pressure switches being opened or closed, said hydraulic unit constituting a sway detection device for sensing the onset of a sway condition of a towed vehicle relative to a towing vehicle.

4,040,508

CONTROL CIRCUIT FOR CONTROLLING THE SHAFT SPEED OF A MOTOR HAVING CLUTCH AND BRAKE DEVICES

Masayoshi Sunada, and Kuniaki Kubokura, both of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed Jan. 13, 1976, Ser. No. 648,674
Claims priority, application Japan, Jan. 20, 1975, 50-7810
Int. Cl.[2] F16D *67/07*
U.S. Cl. 192—12 D **7 Claims**



1. A control circuit for controlling the shaft speed of a motor having clutch and brake devices comprising:

a speed detector for detecting the actual rotating speed of said shaft and generating a first pulse signal having a period in inverse proportion to said actual rotating speed;

a speed selector for setting a desired-speed of said shaft;

a signal generator for generating a second pulse signal having a period in inverse proportion to the desired-speed from said speed selector;

first means for detecting the ratio of the period of the first signal to the period of the second signal; and

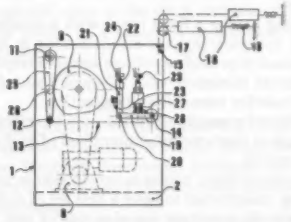
second means for actuating said brake device where said ratio is less than or equal to a predetermined value, for actuating said clutch device when said ratio exceeds said predetermined value.

4,040,509

AUTONOMOUS GROUP FOR MECHANICAL CONTROL OF MACHINES

Jean Leon Missioux, 55 Boulevard Gambetta, 95 Sannois, France

Filed Nov. 24, 1975, Ser. No. 634,628
Claims priority, application France, Dec. 4, 1974, 74.39588
Int. Cl.[2] F16D *71/00*; B65H *25/14, 25/32*
U.S. Cl. 192—150 **7 Claims**



1. Transmission group for mechanical control of machines comprising an independent assembly including at least one rotating shaft, at least two cams removably mounted on said shaft, a pivoted lever engaging each of said cams, a non-extensible flexible member connected to each of said levers and to the machine to be controlled outside of the group, said non-extensible flexible members transmitting the cyclical movement of said cams to the machines to be controlled, security means reacting to variations of tension in said non-extensible flexible members to stop the control group upon occurrence of

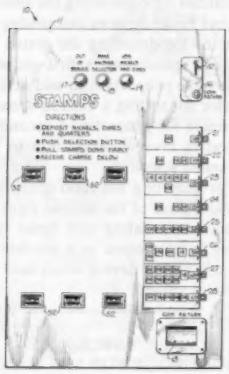
an excessible variation of tension in said non-extensible flexible members between said levers and the machines to be controlled, a housing for the independent transmission group, a driving motor in said housing rotating said shaft, a base for the transmission group, said housing including at least two walls removably mounted on said base and disposed opposite each other and two vertical spaced parallel plates within said walls and secured to said base, said two vertical walls supporting said shaft, said shaft extending across said base.

4,040,510

STAMP VENDING MACHINE

Walter A. Peters, Schaumburg; Curtis A. Hozian, Wheeling, and Richard W. Gusek, Chicago, all of Ill., assignors to Gard, Inc., Niles, Ill.

Filed June 17, 1976, Ser. No. 697,024
Int. Cl.[2] G07F *11/68*
U.S. Cl. 194—2 **11 Claims**



1. A vending machine useful for dispensing stamps from one or more rolls of strips of stamps during a transaction, which comprises:

a housing having a front panel with a number of holes;

money acceptor/rejector means having at least one output terminal to provide a voltage signal in response to a predetermined minimum value of money added to said acceptor/rejector means for a transaction;

a number of manually operated switches electrically coupled to said at least one output terminal of said acceptor/rejector means;

main control logic means mounted within said housing and being constructed to have a first set of outputs to provide selectively a voltage signal at one of said first set of outputs and to have additional sets of outputs to provide, by one or more of each additional set of outputs, binary information as voltage signals;

at least first and second stamp-dispensing mechanisms, as modules, mounted within said housing, each module including:

support means having a portion constructed to support a roll of a strip of stamps for free rotation of the roll about the axis of the roll;

an enclosure mounted on one margin of said support means and spaced from said portion of said support means that rotatively supports a roll of stamps, said enclosure being in alignment with one of said holes of said front panel and said enclosure having a slot for passage of a strip of stamps through said slot of said enclosure;

motor means mounted on said support means and including a motor and an output shaft;

stamp-feeding means mounted on said support means and including a feed wheel that is operatively connected to said output shaft of said motor means and is located between said enclosure and said portion of said supporting means that rotatively mounts a roll of the strip of stamps, said stamp-feeding means being constructed to move the strip of stamps by said feed wheel to and through said slot of said enclosure; and

module control logic means mounted on said support means, said module control logic means being constructed with one input and a set of inputs to be responsive to a signal provided to said one input and to signals, providing binary information, to said set of inputs from said main control logic means to initiate the operation of said motor and to stop the operation of said motor;

first set of electrical coupling means, each coupling means of said first set being connected to a different one of said first set of outputs of said main control logic means and to said one input of a different one only of said module control logic means of said modules; and

additional sets of coupling means, each set being connected to a different one of said additional sets of outputs of said main control logic means and to said set of inputs of said module control logic means of a different one of said modules,

said main control logic means including in its construction a printed circuit board having printed conducting lines comprising:

first sets of lines with the number of sets corresponding to the number of said modules and with the number of lines of each set corresponding to the number of lines required to provide binary information to said outputs of each of said additional sets of outputs to which said lines of each set are connected;

a first additional set of lines corresponding in number to the number of said manually operated switches, each line being connected to a different one of said manually operated switches; and

a second additional set of lines, each line being connected to a different one of said first additional set of lines and with said main control logic means being constructed to provide a voltage signal to one of said first set of outputs of said main control logic means based on a voltage signal provided to one of said lines of said second additional set of lines, and

said main control logic means further including in its construction:

first sets of spaced terminals mounted on said board, each set of terminals being connected to a different line of said first sets of lines; and

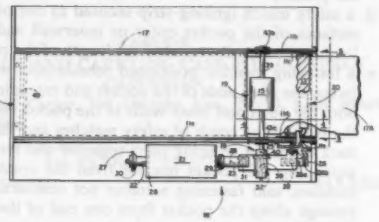
second sets of spaced terminals mounted on said board, each set of said second sets being connected to a different line of said first additional set of lines so that each terminal of said second sets of spaced terminals provides with a different one of said terminals of said first sets of terminals a pair of terminals connectable by a diode,

whereby the selective connection of pairs of terminals by diodes provides specific binary information as signals to one or more of said additional sets of outputs of said main control logic means when one of said manually operated switches is closed, so that at least one module is operated to dispense stamps in a number in accordance with the binary information provided to said set of inputs of said module control logic means of the module by said main control logic means.

4,040,511
PAPER MOVING MECHANISM

Herbert R. Beaven, Jr., Los Altos, and Daniel M. Roberts, Saratoga, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Sept. 5, 1975, Ser. No. 610,905
Int. Cl.[2] B41J *15/00*
U.S. Cl. 197—133 R 11 Claims



1. Apparatus for selectively advancing paper past a printing station comprising:

a paper storing compartment having an access panel;

advance means mounted adjacent said paper storing compartment for advancing said paper past said printing station;

support means rotatably mounted on the frame of said apparatus for positioning a portion of said paper in contact with said printing station;

linkage means including controlled means coupled to said advance means and including means for engaging and moving said support means from said printing station, and for simultaneously moving said advance means to advance said portion of said paper a predetermined distance past said printing station,

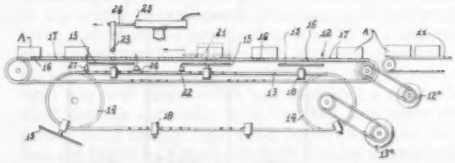
said advance means including a shaft having a roller fixedly mounted thereon, said roller being in contact with said paper; and

one way clutch means mounted to one end of said shaft and coupled to said linkage means, said one way clutch means ensuring rotation of said shaft in only one direction.

4,040,512
METHOD OF AND MEANS FOR INDEXING ARTICLES

Warren C. Ness, 6211 W. Touhy Ave., Chicago, Ill. 60648

Filed Jan. 12, 1976, Ser. No. 648,363
Int. Cl.[2] B65G *47/26*
U.S. Cl. 198—460 13 Claims



1. An apparatus for sequentially indexing a first article having at least a predetermined minimum overall spacing behind a second article on a conveyor wherein said overall spacing includes the spacing between said first and said second article and the length of said first article, said apparatus comprising:

a. sensing means for determining the position of said first article on said conveyor; and

b. positioning means responsive to said sensing means for:

1. lifting said first article from said conveyor if said sensing means indicates that said first article is mispositioned;

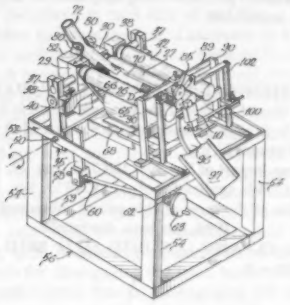
2. moving said first article if thusly lifted at a speed greater than the speed of said conveyor; and

3. placing said first article on a surface at a position where it will lie a positive integral number of unit lengths behind said second article, said unit length being longer than the lengths of said first and second articles and no longer than said minimum overall spacing.

4,040,513
DISC ADVANCING AND METERING DEVICE

Leroy C. Walls, Valparaiso, Ind., assignor to Lewals, Inc., Chesterton, Ind.

Division of Ser. No. 308,145, Nov. 20, 1972, Pat. No. 3,886,892.
This application Dec. 16, 1974, Ser. No. 533,184
Int. Cl.[2] B65B *7/28;* B67B *3/08*
U.S. Cl. 198—530 3 Claims



1. A feeding mechanism for feeding a row of similar discs on edge in parallel relationship wherein each disc has a circular peripheral edge and a center of gravity displaced from the plane of the circular edge, comprising,

a. a pair of generally cylindrical support rollers rotatably mounted at one end in cantilever fashion in generally horizontal spaced side-by-side relationship with the space between the rollers less than the radius of the discs to provide a cradle for supporting the discs on edge,

b. means for rotating the rollers in the same angular direction so that adjacent surfaces of the rollers move in opposite directions to advance the discs along the rollers from said one end to the other,

c. means for advancing a row of discs to the cradle at said one end of the rollers,

d. holddown means disposed over the cradle to hold the discs against the rollers, and

e. the advancing means comprises a tubular guide extending toward said one end of the rollers, a pair of feed rollers disposed at opposite sides of the guide and having surfaces engaging opposite sides of the discs, and means for rotating the feed rollers in a direction to advance the discs along the guide.

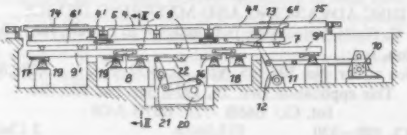
4,040,514
LIFTING BEAM COOLING AND CONVEYING BED

Klaus Peter Pielsticker, Dusseldorf; Friedel Mogendorf, Duisburg, and Karl Heinrich Sonnabend, Ratingen, all of Germany, assignors to Schloemann-Siemag-Aktiengesellschaft of Duesseldorf, Germany

Filed July 22, 1976, Ser. No. 707,484
Claims priority, application Germany, Aug. 1, 1975, 2534363
Int. Cl.[2] B65G *25/04*
U.S. Cl. 198—774 4 Claims

1. A lifting beam cooling and cross-conveying bed which comprises stationary support beams and movable support beams, the movable beams being divided into portions being articulated together, and a support arrangement for the movable beams which comprises transversely movable support members which are also divided into portions and articulated and on which the movable beams are supported, profiled tracks mounted on the undersides of the support members, and

rollers on which the tracks run, and wherein the profiles of the tracks are such that when the movable beams are driven in a conveying direction, the individual portions can be either



raised or lowered or maintained in a raised or lowered position, with the different portions being subjected to different vertical movement sequences.

4,040,515

CHEMICAL DISPENSING APPARATUS

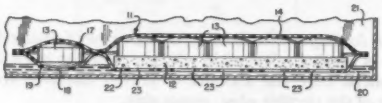
Harold H. Hessel, Briarcliff Manor, and Francis S. Kiele, Pleasantville, both of N.Y., assignors to Stewart-Hall Chemical Co., Mount Vernon, N.Y.

Continuation-in-part of Ser. No. 108,774, Jan. 22, 1971, Pat. No. 3,754,871. This application Apr. 11, 1973, Ser. No. 350,192

The portion of the term of this patent subsequent to Aug. 28, 1990, has been disclaimed.

Int. Cl.[2] A23F *1/08;* **B65D** *81/74;* **B01D** *59/22*

U.S. Cl. 206—.5 **15 Claims**



1. A chemical dispenser apparatus comprising a porous plastic capillary matrix exhibiting capillary action towards a fluid when a surface area of said matrix is contacted by said fluid, a dissolvable chemical composition resting on an upper surface of said matrix, and housing means comprising a fluid impermeable flexible plastic envelope above said matrix and said chemical composition, a peripheral edge portion of said envelope secured to the outer edges of said capillary matrix, and said chemical composition being held between said housing and the upper surface of said capillary matrix.

4,040,516

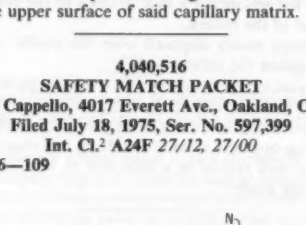
SAFETY MATCH PACKET

Anthony S. Cappello, 4017 Everett Ave., Oakland, Calif. 94602

Filed July 18, 1975, Ser. No. 597,399

Int. Cl.[2] A24F *27/12, 27/00*

U.S. Cl. 206—109 **1 Claim**



1. A safety match packet comprising:

a. a semi-flexible rectangular sheet folded upon itself to form an interconnected front and back cover to house a comb of safety matches and enclose the heads of the safety match comb;

b. said rectangular sheet having an additional length extending beyond said back cover to be folded into a safety match receiving pocket that is open at both ends in order to readily receive a match head and has an unobstructed length coextensive with the width of the rectangular sheet;

c. the pocket having an outer wall spaced from an inner wall of the pocket by a spacing wall whose plane extends substantially at right angles to the planes of said outer and inner walls of said pocket, the end of the inner pocket wall contacting the adjacent portion of the outer pocket wall to constitute a closure for the pocket that parallels the plane of said spacing wall and extending through the length of the pocket;

d. a safety match igniting strip secured to one of the inner surfaces of the pocket outer or innerwall and having a length substantially equal to the length of the pocket; and

e. a fastening member positioned substantially midway between the open ends of the pocket and extending through both the outer and inner walls of the pocket also through the base of the comb of safety matches and through said back cover for securing them together and for positively separating the pocket interior from the comb of safety matches, said fastening member not obstructing a clear passage along the pocket from one end of the pocket to the other open end;

f. the lateral interior spacing between the outer and inner walls of the pocket being substantially the same throughout the length of the pocket to loosely receive the head and part of the shank of a safety match whether the match is inserted from either open end of the pocket, whereby lateral inward pressure is required to be applied against the outer wall of the pocket and against said back cover for forcing said outer pocket wall against the match head for forcing the latter against said match igniting strip so that an outward pull of the exposed shank of the match will cause the head to frictionally engage with the igniting strip to ignite the match head while it is still within the pocket so that the pocket will prevent any undue flaring of the match head material from striking the person using the match pocket and also from contacting with the comb of safety matches.

4,040,517

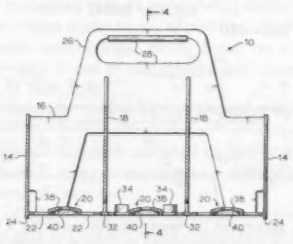
STACKING CASE

Thomas Evald Torokvei, Don Mills, Canada, assignor to Scepter Manufacturing Company Limited, Toronto, Canada

Filed Dec. 8, 1975, Ser. No. 638,358

Int. Cl.[2] B65D *1/24, 1/36, 85/54*

U.S. Cl. 206—144 **9 Claims**



1. A carton of generally rectangular shape in plan view for carrying a plurality of bottles comprising:

means for defining side and end walls;

a single wall constituting a vertically and longitudinally extending central dividing member having oppositely disposed surfaces, said single wall having a recess upwardly extending from its bottom edge for a predetermined distance, said recess forming an opening through said oppositely disposed surfaces;

partition walls cooperating with said single wall and said means for defining side and end walls to divide the carton into a plurality of cells for receiving bottles;

upright handle means connected to said single wall and located above said means for defining said side and end walls;

said recess of said single wall being proportioned to receive the handle means of a similar empty carton when in stacked relationship; and

means coupled to said partition walls and said single wall for defining for each of said cells a bottom support for a bottle placed in said cell, said last named means being open in the region of said recess of said single wall.

4,040,518

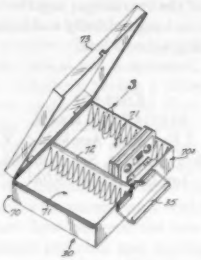
STORAGE AND CARRYING CASE FOR COMPACT CASSETTES

Jesse Donald Carter, 741 Orizaba Ave., No. 3, Long Beach, Calif. 90804

Filed Apr. 22, 1976, Ser. No. 679,391

Int. Cl.[2] B65D *85/672, 1/34*

U.S. Cl. 206—387 **14 Claims**



1. A case for storing and carrying a plurality of magnetic tape cassettes of a type described as compact cassettes having two tape drive hub openings in the sides thereof and a cassette recorder coupling edge having a magnetic tape head engaging opening therein on said edge, said case comprising in combination:

a cassette tray for receiving and storing compact cassettes in transverse parallel position, having a bottom wall, left and right sidewalls and back and front walls joined together to form an open top rectangular shaped tray, said walls extending substantially equidistantly above the bottom wall a heighth less than that of a compact cassette, said tray having an inside width between the sidewalls slightly greater than a length of a compact cassette and having an inside length between front and back walls equal to a sum of a plurality of incremental distances, each increment being slightly greater than a maximum width of a compact cassette, said tray having a plurality of cassette positioning rib sets, a first member of each set being integral with a right tray wall inner surface and extending a relatively short distance outwardly therefrom and at a lower rib portion being integral with a tray bottom wall inner surface and extending a relatively short distance transversely along said bottom wall inner surface and a remaining second member of each rib set being similarly disposed along a tray left wall inner surface and bottom wall inner surface and being in parallel alignment with the right wall set member, said plurality of rib sets being disposed longitudinally from a first rib set adjacent a front tray wall inner surface to a last rib set adjacent a back tray wall inner surface, each of said rib sets having a distance between adjacent rib sets such that a compact cassette positioned between adjacent rib sets and a cassette recorder coupling edge resting on and in parallel alignment with the tray bottom wall inner surface nearly touches an adjacent compact cassette similarly positioned between adjacent rib sets, said cassettes being positioned in leafed arrangement, a top cover rearwardly hinged to the tray back wall having a cover top wall, left and right cover sidewalls, and front and back cover walls joined together to form an open bottom rectangular shaped tray covering having an opening substantially equivalent to a tray top opening, said cover walls being of at least sufficient depth, when the cover is closed, to enclose compact cassettes positioned transversely within the tray, and

a case latch means further comprising in combination;

a tray cover latch engaging throughhole in the cover front wall a relatively short distance above a tray cover front wall lower edge extending through the tray cover front wall, said throughhole having a latch positioning slot opening downwardly and out of the cover front wall lower edge, said throughhole further having latch hook retaining shoulders on each side of said slot,

a latch member having a lower end mounted on a tray front wall inner surface, a throughhole engaging hook on a top end, a latch positioning member a relatively short distance below said hook, and a resilient shank intermediate said latch positioning member and the lower end, said latch positioning member extending forwardly across a tray front wall top edge and forward the tray front wall front surface a distance greater than a throughhole engaging hook length, said latch positioning member being inserted into the said slot when the cover is closed and said hook engaging said hook engaging shoulder, said forwardly extending latch positioning member further comprises a push button for disengaging the latch hook upon depressing the push button thereby disengaging the latch hook from the throughhole to permit opening the cover.

4,040,519

FROTH FLOTATION PROCESS FOR RECOVERING SHEELITE

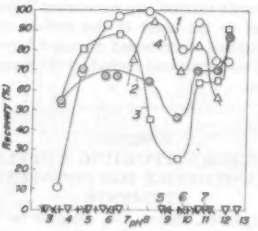
Koji Fukazawa, Iwaki, Japan, assignor to Nittetsu Mining Company, Ltd., Tokyo, Japan

Filed Feb. 20, 1975, Ser. No. 551,239

Claims priority, application Japan, Mar. 28, 1974, 49-33927; Mar. 28, 1974, 49-33928

Int. Cl.[2] B03D *1/14*

U.S. Cl. 209—166 **6 Claims**



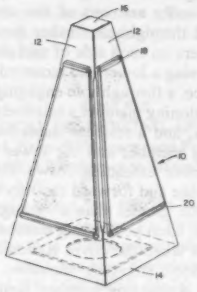
1. A process for recovering scheelite concentrate from scheelite ores which comprises in an alkaline treatment step, treating a low grade scheelite containing concentrate obtained from said ore by initial froth flotation and containing an objectionable amount of adsorbed collector added during said initial froth flotation, which amount of adsorbed collector interferes with further stages of scheelite concentration of froth flotation, with caustic soda as an alkaline substance in an amount sufficient to substantially remove said amount of objectionable adsorbed collector, in water to form a pulp and filtering the pulp to form a cake,

washing the cake with water, and repulping the cake and thereafter in a flotation step, adding 20–40 kg/t-ores in the repulped cake of quebracho as a depressant for sulfide minerals and silicate minerals to the repulped cake and conditioning the pulp for 3–5 minutes and then, following the conditioning step,

floating the conditioned pulp at a pH of 9.5–10.5 with addi-

tion of 30–150 g/t-ores in the conditioned pulp of a fatty acid collector and 50–160 g/t-ores of a frother and recovering a scheelite concentrate.

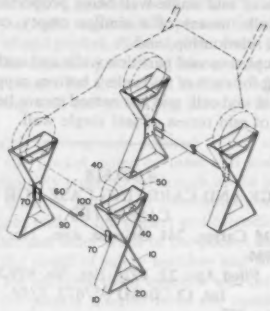
4,040,520
DISPLAY DEVICE
Jean Joaquin, 2 Niven Way, Larkspur, Calif. 94939
Filed Aug. 25, 1975, Ser. No. 607,565
Int. Cl.[2] A47F *3/10*
U.S. Cl. 211—13 **10 Claims**



1. A device for displaying and serving a multiplicity of relatively small articles which may be easily removed therefrom when selected for removal, said device comprising:
a support having a series of planar surfaces extending generally upwardly from a bottom surface;
retainer members fixed to each planar surface and spaced apart near upper and lower ends of each said surface for slidably receiving mounting boards in directions parallel to said planar surface, said retainer members including lip portions extending parallel to the associated planar surface; and
a said rigid mounting board removably held on each planar surface between said retainer members, said mounting board being adapted to manually removably receive the small articles, said retainer members retentatively engaging said boards against any movement having a component normal to the plane of the surface on which said board is disposed, each board disposed between said planar surface and the plane including the associated pair of lip portions.

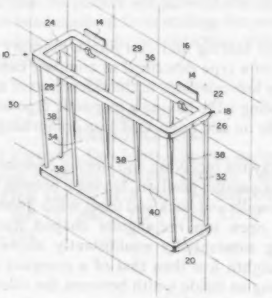
4,040,521
ELEMENTS FOR SUPPORTING WHEELS ABOVE GROUND AND DEVICE FOR CONNECTING THE ELEMENTS
Richard L. Fitzpatrick, Baker, La., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest
Filed Sept. 22, 1976, Ser. No. 725,643
Int. Cl.[2] A47F *7/04*
U.S. Cl. 211—24 **1 Claim**

1. A device for supporting two horizontally spaced vertical wheels at the same vertical level above ground, said device comprising:
first and second like elements, each element having a central slot extending transversely inwardly from the center of one of the elongated sides of the centerline of the plate, the plates engaging each other with their slots so as to form a vertically elongated X when viewed from the side, a horizontal base plate connecting the bottom ends of the support plates together, and a concave plate connecting the top ends of the support plates together with the concave facing upwardly and disposed mainly below the top ends, said elements being spaced apart with the sides of the support plates and one element being aligned with the sides of the support plates of the other element;
like first and second vertical leaf hinges, each hinge being secured flat to the junction of the sides of the corresponding one of the two elements; and



an elongated horizontal telescopic member connecting the second leaves of the two hinges together, each end of the member being cut longitudinally and being secured flat to the corresponding second leaf.

4,040,522
MAGAZINE RACK
Warren J. Vickery, 7 Fox Run, Armonk, N.Y. 10504
Filed May 7, 1976, Ser. No. 684,309
Int. Cl.[2] A47G *29/00*
U.S. Cl. 211—88 **5 Claims**



1. A magazine rack for receiving magazines therein, which comprises:
a. an opened top frame;
b. a base;
c. a plurality of elongated elements;
d. means for joining each said elongated element to said base and said top frame, wherein said elongated elements are spaced apart from each other to create a plurality of upwardly extending walls having a plurality of elongated openings therethrough, said joining means including,
a bifurcated rubber ring member affixed to each end of said elongated element, each said end having an opening therein,
a first snap element disposed in each of a plurality of holes in an upper surface of said base, one of said snap elements received through a first bifurcated ring member into a first opening in each of said elongated elements, and
a second snap element disposed in each of a plurality of apertures in a lower surface of said top frame, one of said second snap elements received through a second bifurcated ring member into a second opening in each said of elongated elements; and

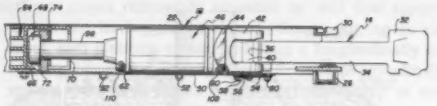
e. means for securing said rack to a vertical surface.

4,040,523

RAILWAY CAR CUSHIONING DEVICE

Ross G. Carle, and James R. Reinhardt, both of Houston, Tex., assignors to ACF Industries, Incorporated, New York, N.Y.

Filed Mar. 3, 1976, Ser. No. 663,400
Int. Cl.² B61G *9/08*
U.S. Cl. 213—46 R **6 Claims**



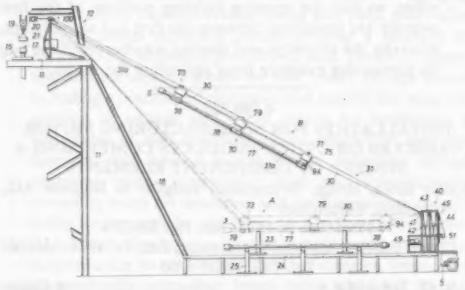
1. A hydraulic-pneumatic cushioning unit comprising a cylinder having front and rear end portions, a piston mounted within the cylinder for reciprocal movement, a piston rod secured centrally to a face of the piston and extending through an opening in the rear end portion of the cylinder, said cylinder forming a high pressure chamber adjacent the front face of the piston and a low pressure chamber adjacent the rear face of the piston in which the piston rod is mounted, said high pressure and low pressure chambers having a mixture of gaseous and liquid fluid therein under a preload fluid pressure with the gaseous fluid in the high pressure chamber containing at least 5 percent of the total volume of the high pressure chamber, said piston having an opening therethrough at a position radially spaced from the longitudinal axis of the position rod, and normally closed valve means mounted within said piston opening to control fluid flow between the low pressure chamber and the high pressure chamber and having a relatively large buff flow passage and a restricted draft flow passage, said valve means when moving with the piston in buff travel from extended position remaining closed for at least the initial two inches of buff travel to permit the mixture of gas and liquid in the high pressure chamber to reach a predetermined high value before opening of the buff flow passage for the metering of the mixed gaseous and liquid fluid from the high pressure chamber to the low pressure chamber, said valve means upon return draft travel after buff travel closing the buff flow passage and opening the restricted draft flow passage to permit the metering of the mixed gaseous and liquid fluid from the low pressure chamber to the high pressure chamber and return of the cushioning unit to neutral position.

4,040,524

APPARATUS FOR HANDLING PIPE AT WELL SITE

William C. Lamb, Lafayette, and Rodney J. Wetzel, St. Martinville, both of La., assignors to Lamb Industries, Inc., Lafayette, La.

Filed June 7, 1971, Ser. No. 150,331
Int. Cl.² E21B *19/00*
U.S. Cl. 214—2.5 **5 Claims**



1. Apparatus for transporting pipe-like members between the elevated floor of a well derrick and a lower storage area which comprises:

a. support cable means extending between and being supported at one end proximate said elevated floor and at the opposite end proximate said storage area and being unsupported therebetween to provide a track between said floor and said storage area;

b. trolley means for stably supporting said pipe-like member at least at two spaced points, said trolley means being adapted for travel along said support cable means and including:

i. two independently movable trolleys having means to receive and support said pipe-like member,

ii. trolley cable means passing from said elevated floor, through the uppermost of said two trolleys and affixed to the lowermost of said two trolleys, and

iii. holding means on said uppermost trolley to grip said trolley cable means to prevent movement of said uppermost trolley independent of said trolley cable means;

c. means to move said trolley means on said support cable means from the vicinity of said elevated floor to the vicinity of said storage area; and

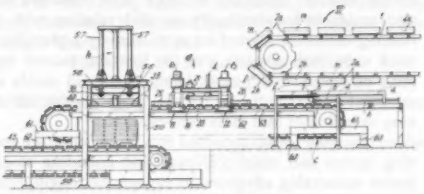
d. cable tensioning means having means to anchor one end of said support cable means, and having means to selectively change the unsupported length of said support cable means to enable said support cable means to assume a first slackened position wherein said two spaced points on said trolley means are disposed substantially horizontally in the vicinity of said storage area and a second position wherein said support cable means extends in a substantially direct incline from said storage area to said elevated floor.

4,040,525

METHOD AND APPARATUS FOR STACKING INGOTS ACCORDING TO PREDETERMINED ARRANGEMENTS

Koichi Tokunaga, and Akira Fukuda, both of Kamagaya, Japan, assignors to Mitsui Mining & Smelting Co., Ltd., Tokyo, Japan

Filed June 14, 1976, Ser. No. 695,962
Claims priority, application Japan, Sept. 22, 1975, 50-114500
Int. Cl.² B65G *57/22*
U.S. Cl. 214—6 P **8 Claims**



1. A method of stacking in alternate tiers a plurality of first ingot groups of first predetermined pattern each formed by arranging four ingots in two parallel rows each consisting of a pair of longitudinally aligned ingots, and a plurality of second ingot groups of second predetermined pattern each formed by arranging a pair of ingots in longitudinally parallel relation and disposing another pair of ingots on the longitudinally opposite sides of the former normal thereto, comprising the step of:

delivering one ingot pair from a mold of predetermined shape carried by an endless chain conveyor of a continuous casting apparatus onto an ingot receiving member disposed above an ingot receiving end of a main conveyor and adapted for reciprocating movement in the running direction of said main conveyor so as to arrange the ingots of the ingot pair in longitudinally parallel relation with the running direction of said main conveyor;

retracting said ingot receiving member while restricting the movement of the ingot pair together with the retracting

movement of said ingot receiving member thereby feeding the ingot pair onto said main conveyor;

stopping the movement of said main conveyor temporarily and actuating a push plate disposed between said ingot receiving member and said main conveyor and adapted for reciprocating movement in the running direction of said main conveyor thereby advancing the ingot pair to a predetermined position on said main conveyor;

conveying by said main conveyor a plurality of stack units each consisting of two ingot pairs delivered from said molds and arranged in longitudinally parallel relation with the running direction of said main conveyor;

rotating two ingots 90° relative to the remaining two in alternate stack units being conveyed by said main conveyor thereby changing the pattern into another pattern such that the two rotated ingots formerly disposed on the longitudinally opposite sides of and in longitudinally normal relation to the latter two ingots arranged in longitudinally parallel relation with the running direction of said main conveyor are arranged transversely thereto;

transferring the stack units of alternately different patterns across the conveying end of said main conveyor into a rotary casing which acts to turn the ingots upside down so as to direct the legs downward when the stack unit transferred thereinto consists of four legged ingots; and

stacking in alternate tiers the stack units of different patterns passed through said rotary casing on a transfer conveyor.

3. An apparatus for stacking in alternate tiers a plurality of first ingot groups of first predetermined pattern each formed by arranging four ingots in two parallel rows each consisting of a pair of longitudinally aligned ingots, and a plurality of second ingot groups of second predetermined pattern each formed by arranging a pair of ingots in longitudinally parallel relation and disposing another pair of ingots on the longitudinally opposite sides of the former normal thereto, comprising:

an endless chain conveyor forming part of a continuous casting apparatus and having a pair of parallel mold trains each including a predetermined number of molds for casting a plain ingot and two molds for casting a legged ingot, the transversely adjacent ones of said molds in said mold trains being of the same type;

an endless conveyor having the ingot receiving end thereof disposed beneath the delivery end of said chain conveyor for successively receiving the ingot pairs delivered from said molds in longitudinally parallel relation with the running direction thereof so as to convey a plurality of stack units each consisting of the first and second ingot pairs delivered at different timing from said molds and arranged in longitudinally parallel relation with the running direction of said main conveyor;

pattern changing means mounted to a frame structure spanning across said main conveyor and including stopper means retractably advanced to engage the longitudinally aligned ingots in the first and second ingot pairs while conveying the ingot pairs by said main conveyor thereby bringing the trailing ingot in the first ingot pair into side-by-side relation with the leading ingot in the second ingot pair, and a first and a second arm swingably mounted to said frame structure for rotating the leading ingot the first ingot pair and the trailing ingot in the second ingot pair 90° relative to the remaining two ingots respectively;

a push plate for urging the stack units of alternately different patterns one after another across said main conveyor;

a rotary casing disposed adjacent to the conveying end of said main conveyor for receiving therein the stack units of alternately different patterns forced one after another by said push plate across said main conveyor, said rotary casing operating to turn the ingots upside down so as to direct the legs downward when the stack unit transferred thereinto consists of four legged ingots, and

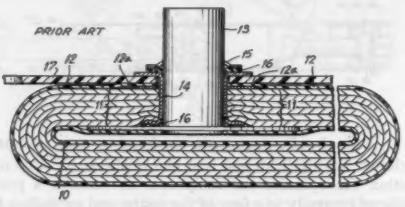
means disposed adjacent to said rotary casing for receiving the stack units of alternately different patterns passed one after another through said rotary casing and stacking the stack units in alternate tiers on a transfer conveyor disposed therebeneath.

4,040,526

DUNNAGE BAG

Robert Olin Baxter, and Arthur Louis Rothschild, III, both of Camden, Ark., assignors to International Paper Company, New York, N.Y.

Filed Mar. 26, 1976, Ser. No. 670,709
Int. Cl.[2] B60P 7/14
U.S. Cl. 214—10.5 D 1 Claim



1. In an expandable dunnage bag having an airtight bladder, a multi-ply tube formed of a plurality of bladder reinforcing sheets enclosing the bladder, and a valve extending through the sheets through which air is introduced into the bladder to expand the bag, the improvement comprising

a moisture resistant coating on the outermost one of the sheets;

a moisture resistant overslip surrounding each of two opposite ends of the bag, the overslips together surrounding only a minor portion of the bag, each overslip being made of thermoplastic material compatible with the coating on the outermost sheet and having an open and closed end, the closed end of each overslip being adjacent the outermost edge of the end of the bag the overslip surrounds and the open end of each overslip being heat sealed to the outermost sheet;

the outermost sheet having at least one seam extending from one to the other of the two opposite ends of the bag, the overslips each covering an end of the seam and a moisture resistant tape covering the portion of the seam between the seam ends;

portions of one of the overslips defining an opening through which the valve extends, the opening having a diameter substantially equal to the inside diameter of the valve, so that the opening defining portions tightly fit around the valve;

a first clip through which the valve extends, the first clip underlying the opening defining portions of the first overslip and being in frictional engagement with the valve;

a bag handle through which the valve extends, the handle overlying the opening defining portions of the first overslip and having a cap for sealing the valve;

a second clip overlying the opening defining portions of the first overslip and being in frictional engagement with the valve, so that the opening defining portions of the first overslip are positioned between the first and second clips, whereby the overslips and coating weatherproof the bag by preventing moisture from pervading the sheets.

4,040,527

INSTALLATION FOR MANUFACTURING MOTOR VEHICLES OR OTHER PRODUCTS COMPRISING A NUMBER OF COMPONENT ELEMENTS

Walter Krieg, Brugg, Switzerland, assignor to Digitron AG., Brugg-Biel, Switzerland

Filed Jan. 9, 1975, Ser. No. 539,734
Claims priority, application Germany, Jan. 21, 1974, 2402665
Int. Cl.[2] E04H 6/06
U.S. Cl. 214—16.4 A 6 Claims

1. An assembly line and apparatus for conveying an element

along said assembly line in a manufacturing apparatus, said assembly line including guide means defining a path in said manufacturing process, said assembly line and apparatus comprising:

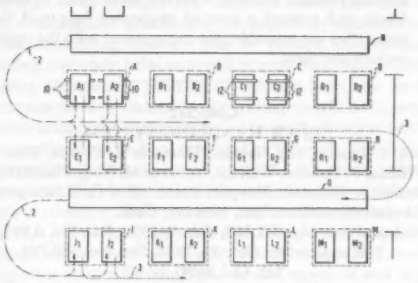
truck means and drive means therefor, said truck means including control means responsive to said guide means for effecting a steering of said truck means to maintain a predefined relation of said truck means to said guide means and said path;

first support means on said truck means;

platform means removably mounted on said first support means and having means thereon for supporting an element, said platform means including a longitudinally extending beam and a pair of parallel and longitudinally spaced transverse beams extending transversely of said longitudinally extending beam;

centering means on said truck means for effecting a centering of said platform means on said truck means, said centering means being positioned so that said platform means is incapable of moving in directions parallel to a theoretical plane containing said platform means and permitting a movement of said platform means only vertically relative to said truck means, said centering means engaging said longitudinally extending beam and said transversely extending beams to effect said centering of said platform means on said truck means;

roller means mounted on said platform means, said roller



means being oriented on said platform means to facilitate a rolling movement in one direction;

work station means spaced along said path and having movable support members at spaced locations therein adapted to be moved into supporting relationship with said platform means to free said truck means from supporting said platform means and thereby facilitate a movement of said truck means to locations remote from said platform means; and

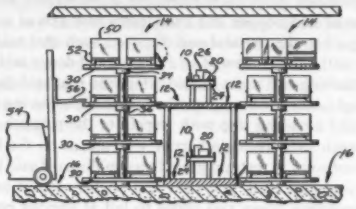
buffer storage means located in said path, said buffer storage means having second support means thereon for engaging said platform means traveling along said path, said buffer storage means including means defining a plurality of locations for storing a plurality of said platform means, said second support means on said buffer storage means including a plurality of elongated and parallel bar supports adapted to engage said roller means for facilitating a movement of said platform means relative to said bar supports, said second means further including second centering means cooperative with said longitudinally extending beam for centering said platform means on said buffer storage means, said second centering means including at least one grooved roller rotatable about an axis perpendicular to said longitudinally extending beam, said longitudinally extending beam being received in the groove of said grooved roller.

4,040,528

WAREHOUSING SYSTEM WITH TURNTABLE HAVING OPPOSED ARTICLE RECEIVING STATIONS THEREON

Kenneth A. Hutchins, Fort Wayne, Ind., assignor to Peter Eckrich and Sons, Inc., Fort Wayne, Ind.

Filed June 30, 1975, Ser. No. 591,457
Int. Cl.[2] B65G *1/06*
U.S. Cl. 214—16.4 A 10 Claims



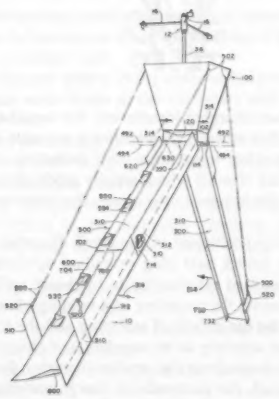
1. A warehousing system comprising: an elongated conveyor for moving material in a predetermined direction; means defining an elongated walkway on at least one side of said conveyor; means defining a material loading area extending in parallel spaced relationship to said walkway; a plurality of turntables, at least one of said turntables having independently rotatable shelves thereon, each shelf having opposite material receiving stations, said turntables being disposed between said walkway and said material loading area in a series extending parallel to said walkway, said turntables being mounted for rotation about parallel vertical axes so that either of said material receiving stations may be selectively disposed to face and being accessible from the walkway with the other of said material receiving stations facing and being accessible to said loading area to be reloadable therefrom as desired; and means for placing on a receiving station facing the loading area concurrently a plurality of warehoused articles to be removed manually piecemeal therefrom and placed on said conveyor when the so placed articles are brought adjacent to the walkway by subsequent rotation of the turntable.

4,040,529

GRAIN FLOW PROPELLED GRAIN SPREADER

Marion E. Wurdeman; James E. Wurdeman, both of Highway 30 East, Columbus, Nebr. 68601, and Arnold F. Kopaska, Rte. 3, Guthrie Center, Iowa 50115

Filed May 17, 1976, Ser. No. 687,194
Int. Cl.[2] B65G *65/32*
U.S. Cl. 214—17 CB 9 Claims



1. A grain spreader comprising support means attachable to an upper part of a grain bin, a hopper disposed beneath said

support means, means rotatably mounting said hopper on said support means for rotation about a vertical axis, fins attached to said hopper and disposed at least mostly above the bottom of said hopper, said fins being disposed at angles with respect to the vertical such that when grain is directed so as to flow into the top of said hopper said grain will strike said fins and exert forces on said fins causing rotation of said hopper in a given direction, said hopper having an open top and bottom, a plurality of elongated slides each extending downwardly from the underside of said hopper and away from said axis at an angle with respect to the vertical and disposed such that said grain can flow out of the bottom of said hopper and down said slides, means attaching said slides to said hopper so that said slides are maintained in the position described, each slide having a leading side and a trailing side with respect to the rotation of said hopper, each slide having a barrier wall means on the leading side thereof so as to restrain grain from spilling off said leading side, means along each said slide and so disposed as to cause grain gravitating down said slides to fall at various positions from the trailing side along the length thereof.

4,040,530

SHAFT FURNACE FEED DEVICE

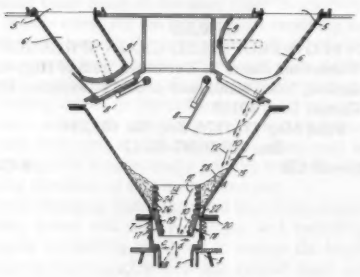
René N. Mahr, Howald-Hesperange, and Aloyse J. Engel, Schouweiler, both of Luxembourg, assignors to S.A. Des Anciens Etablissements Paul Wurth, Luxembourg, Luxembourg

Filed July 2, 1976, Ser. No. 702,104

Claims priority, application Luxembourg, July 11, 1975, 72956

Int. Cl.[2] C21B *7/00*

U.S. Cl. 214—35 R **11 Claims**



1. In a furnace charging installation, the installation including at least a first storage hopper and a movable distribution chute, the charging installation also including a discharge funnel and a feed channel which serially guide charge material released from the hopper to the chute, the improvement comprising:

a tubular plug positioned in the small diameter end of the discharge funnel, said plug extending upwardly into the funnel in spaced relationship to the inner wall thereof to define a cavity for receiving and holding charge material between the outer wall of said plug and the inner wall of said funnel whereby an accumulation of charge material is caused to form about the smaller diameter discharge end of the funnel, the accumulated charge material extending upwardly along the funnel wall at least to the region of impact of freely falling material released into the funnel from the hopper.

4,040,531

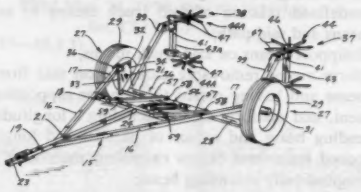
BALE HANDLING APPARATUS

Bryan C. Cross, R.R. No. 3, Box 135, Bedford, Iowa 50833

Filed Dec. 10, 1975, Ser. No. 639,276

Int. Cl.[2] A01D *87/12*

U.S. Cl. 214—77 R **14 Claims**



1. A bale handling apparatus for lifting and moving a hay bale comprising:

a. a portable frame,

b. a pair of lift arms spaced transversely of said frame a distance apart to receive a bale lengthwise therebetween,

c. means pivotally supporting said lift arms adjacent one end of said frame for up and down pivotal movement from a bale loading position to a bale transport position, and

d. a bale engaging unit adjacent the free end of each lift arm engageable with one end of a bale to be handled, each bale engaging unit including a finger assembly rotatable in a substantially horizontal plane when a lift arm is in the bale loading position therefor whereby on advance of said one frame end toward a ground supported bale said finger assemblies are movable into engagement with the opposite ends of the bale.

4,040,532

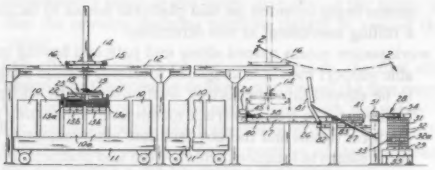
BRICK HANDLING SYSTEM

Frank S. Pearne, San Gabriel; Florentin J. Pearne, Blue Jay; William P. Osborn, Whittier; Terance M. King, Placentia, and Joseph A. Guzzetta, Newport Beach, all of Calif., assignors to Aircraft Mechanics, Inc., Downey, Calif.

Division of Ser. No. 431,967, Jan. 9, 1974, Pat. No. 3,917,081. This application Oct. 29, 1975, Ser. No. 626,721

Int. Cl.[2] B65G *57/22*

U.S. Cl. 214—152 **6 Claims**



1. A method of forming stacks of brick including full layers of laterally and lengthwise aligned and abutting rows of brick and at least one intermediate partial layer of laterally abutting brick having spaced voids between at least two adjacent rows of lengthwise aligned brick to receive the fork of stack handling equipment comprising forming said full layers of laterally abutting rows, sequentially gripping and transferring said full layers as units to a stacking location, and depositing said full layers one on another to form said stacks; and providing said partial layers in said stack by conveying columns of brick along conveyor means to a marshalling location with the columns providing laterally abutting rows of lengthwise aligned brick extending laterally of said columns, moving adjacent lengthwise aligned rows apart as said marshalling location to produce said partial layer with at least two spaced voids while other rows remain laterally abutting, gripping and transferring said partial layer as a unit to said stacking location, and deposit-

ing said partial layer on a previously deposited full layer before a subsequent full layer is deposited thereon.

4,040,533

TRANSPORT DEVICE FOR TEST SAMPLE CARRIERS

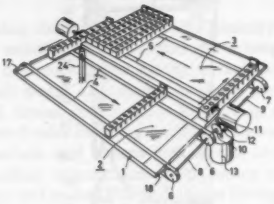
Wilhelmus Johannes De Boer; Willem Schinkel, both of Almelo, Netherlands, and Francis Johannes Span, Villebon-sur-Yvette, France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 21, 1976, Ser. No. 651,118

Claims priority, application Netherlands, Apr. 3, 1975, 7502498

Int. Cl.² B65G *65/04*

U.S. Cl. 214—310 **3 Claims**



1. Test-sample handling apparatus comprising elongate rectangular test-sample containers each having a plurality of open-ended compartments respectively adapted to receive test-sample holders to be brought to a treatment station one after the other, a rectangular table having two adjacently situated longitudinally extending zones, a pair of parallel longitudinally extending conveyor belts arranged in each zone, said containers being transversely positionable on said belts and having protrusions on their undersides for resting on said belts, means to continuously move said respective pairs of conveyor belts in opposite directions, a stop provided at the end of each zone toward which the containers are moved by the conveyor belts, means at the respective ends of the table for transversely displacing a container from one zone to the other in a step-wise manner, at least one of the table ends being associated with a treatment station over which each container is passed during its step-wise transverse displacement and means at said treatment station for ejecting each successive test-sample holder free of the test-sample container which carries said holder.

4,040,534

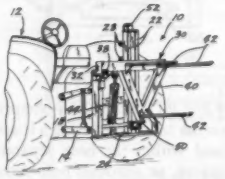
BALED HAY LOADING AND TRANSPORT DEVICE

John B. Kenworthy, Ottumwa, Iowa, assignor to Hay Handling Equipment Company, Des Moines, Iowa

Filed Nov. 11, 1975, Ser. No. 631,148

Int. Cl.² A01D *87/12*

U.S. Cl. 214—766 **6 Claims**



1. A baled hay handling vehicle for transporting and elevating round hay bales comprising,

a tractor vehicle having a pair of lifting arms and a stabilizer arm,

a hay handling device frame having front and rear sides with mounting means on the front side connected to said tractor vehicle lifting and stabilizer arms for raising and lowering said device,

a hay-carrying arm pivotally connected to the rear of said frame for pivotal movement in a plane parallel to said frame,

a hay-engaging finger on said hay carrying arm extending perpendicular to said arm and rearwardly of said frame, and

pivoting means engaging said hay-carrying arm for pivoting said hay carrying arm between raised and lowered positions to elevate a bale of hay above the pivotal axis of said arm whereby said hay bale may be elevated to a height equal to the combined elevating capabilities of said tractor lifting arms and said pivoting means for pivoting said hay carrying arm.

4,040,535

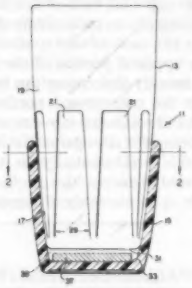
CONDENSATION PROOF DRINKING GLASS ASSEMBLY

Donald L. Shephard, Memphis, Mich., assignor to Helen I. Shephard, Memphis, Mich., a part interest

Filed Sept. 22, 1975, Ser. No. 615,250

Int. Cl.² B65D *23/06*

U.S. Cl. 215—100.5 **2 Claims**



1. A condensation proof glass assembly comprising a cup of plastic material having an inner wall surface of predetermined shape, and a bottom wall;

a glass container with a lower outer wall surface of substantially the same shape as the cup inner wall and having a bottom wall;

snugly and frictionally projected down into said cup;

said bottom walls being spaced apart defining a spill over and condensation reservoir;

a plurality of upright substantially parallel grooves in the outer surface of the container defining corresponding ridges engaging said cup for a series of line contacts therewith;

said grooves forming a series of drip channels conducting water to said reservoir;

said grooves extending from intermediate the height to the bottom of the container;

said cup extending over about the lower one half of the container;

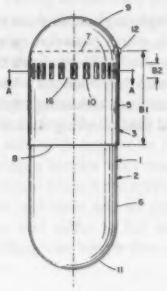
said grooves being concave in shape transversely of the container, of gradually increasing width;

and decreasing depth towards the container bottom.

4,040,536
LOCKING HARD GELATIN CAPSULE

Erwin Schwarz, Eberbach, Baden, Germany, assignor to R. P. Scherer Corporation, Detroit, Mich.

Filed May 5, 1975, Ser. No. 574,324
Int. Cl.[2] A61B *19/02;* B65D *43/10*
U.S. Cl. 220—8 4 Claims



1. A gelatin capsule for receiving a filling comprising, in combination:

a. a body having a closed end, a substantially cylindrical wall and an open end defining a sealing rim, and

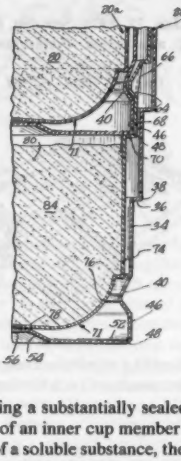
b. a telescoping cap having a closed end with an interior surface, a substantially cylindrical wall and an open end, the open end of the cap receiving the open end of the body with cap wall telescopically overlapping the body wall, said cap wall including a plurality of tooth-like spaced projections in a continuous row about the entire circumference of the cap wall, each of said tooth-like projections projecting inwardly to collectively define a circumferential bead-like rib, each of said tooth-like projections compressing the opposed portion of the body wall inwardly and simultaneously deforming the body wall outwardly intermediate the compressed portions to lock the cap against axial and rotational movement relative to the body upon positioning the rim against the interior surface of the cap to provide a substantially air tight seal, air spaces being provided between the tooth-like projections for escape of air upon assembly of the cap over the body.

4,040,537
DOUBLE-WALLED CUP CONSTRUCTION FOR INTERLOCKING IN NESTED STACKS TO SEAL A FOOD CONCENTRATE BETWEEN ADJACENT CUPS

Bryant Edwards, Clarendon Hills, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Continuation of Ser. No. 536,840, Dec. 27, 1974, abandoned.
This application July 6, 1976, Ser. No. 702,906
Int. Cl.[2] B65D *21/02, 25/18, 85/72*
U.S. Cl. 220—9 R 13 Claims

1. A double-wall thin wall plastic cup comprising inner and outer cup members each having a bottom transverse wall and a sidewall diverging upwardly therefrom to an open outer end, the sidewalls of said cup members being joined together adjacent said upper outer end and the inner cup member thereby being suspended substantially freely within said outer cup member, said inner cup member from its joinder with said outer cup member on down throughout a major portion of the vertical height thereof being substantially laterally spaced from and thereby being laterally substantially unrestrained by said outer cup member, said inner cup member having a circumferential sealing area of predetermined inner diameter and an adjacent inwardly projecting locking ring section above said sealing area and spaced a substantial distance down from said joinder, said outer cup member likewise having a circumferential sealing area spaced below said inner cup member sealing area and having an outer diameter substantially equal to said predetermined inner diameter and an adjacent inwardly projecting locking ring section above said outer cup member sealing area, the outer cup member locking ring section being substantially complimentary to the inner cup member locking ring section of a subjacent telescoped cup but projecting inwardly a greater distance than the locking ring section of said inner cup member to lock telescoped cups together with the sealing ring section of axially adjacent cups in sealing surface

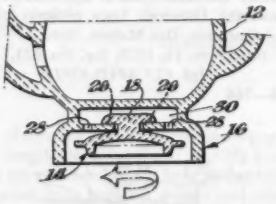


engagement providing a substantially sealed storage compartment at the bottom of an inner cup member of a subjacent pair of cups for receipt of a soluble substance, the suspension of said inner cup member and the absence of lateral restraint thereof by the outer cup member permitting deformation of the axis of a stack of cups and canting or pivoting of an inner cup member relative to an outer cup member without breaking of the seal between axially adjacent cups.

4,040,538
TEAPOT AND LID COMBINATION

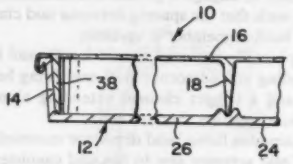
Samuel L. Gerson, P.O. Box 1887, Wilmington, Del. 19899

Filed June 14, 1976, Ser. No. 687,706
Int. Cl.[2] B65D *1/24, 1/36, 57/00*
U.S. Cl. 220—20 5 Claims



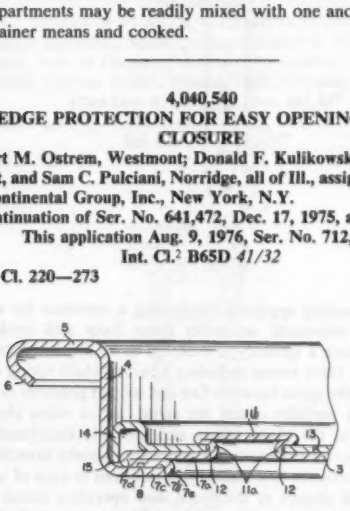
1. A teapot body and lid combination comprising a vertically-extending base on the teapot enclosing a space, a shelf means horizontally disposed within the base separating it into the upper and lower spaces, an unround hole substantially in the midportion of the shelf, an unround knob on the lid slightly smaller than the unround hole in the shelf to permit the knob to be inserted through the hole, the unround knob and hole causing the knob to hang on the shelf when it is inserted through it and rotated out of alignment with it, and the lower space in the base being sufficiently large to store the lid within the base when the knob is hung on the shelf.

4,040,539
COOKING UTENSIL
Silla Patterson, 6959 S. Union Ave., Chicago, Ill. 60621
Filed Apr. 15, 1976, Ser. No. 677,160
Int. Cl.[2] B65D *25/08, 1/24*
U.S. Cl. 220—22 10 Claims



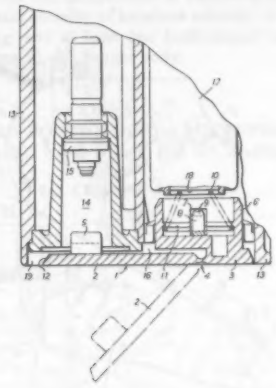
1. A cooking utensil for packaging a plurality of food ingredients to be mixed with one another and subsequently cooked comprising container means having bottom wall means and first side wall means extending around the periphery of said bottom wall means, cover means for closing said container, compartment divider means projecting downwardly from said cover means into said bottom wall means, second side wall means extending around said cover means and projecting downwardly, said second side wall means having an inner face and an outer face, said inner face being sealed to the ends of said divider means to form compartments projecting downwardly from said cover means, said first side wall means and said second side wall means abuttingly engageable with one another, said cover means being sealable to the free end of said first side wall means, divider receiving means positioned on said bottom wall means for sealingly engaging said divider means whereby when said cover means is on said container means, said divider means and said divider receiving means being engageable to form a plurality of compartments sealed on all sides for holding food ingredients to be mixed so that when said cover means is removed said divider means are removed from said container means and the contents of said compartments may be readily mixed with one another in said container means and cooked.

4,040,540
EDGE PROTECTION FOR EASY OPENING END CLOSURE
Obert M. Ostrem, Westmont; Donald F. Kulikowski, Oak Forest, and Sam C. Pulciani, Norridge, all of Ill., assignors to The Continental Group, Inc., New York, N.Y.
Continuation of Ser. No. 641,472, Dec. 17, 1975, abandoned.
This application Aug. 9, 1976, Ser. No. 712,440
Int. Cl.[2] B65D *41/32*
U.S. Cl. 220—273 15 Claims



1. An easy opening container end closure having a ledge portion and a removable panel portion, a single band folded under said panel portion and over said ledge portion, and a score located in said band intermediate the folds of the band presenting smooth turned surfaces on the ledge and the removable panel portion after said score is fractured and the panel portion removed.

4,040,541
HINGED CLOSURE FOR A BATTERY-OPERATED CIGARETTE LIGHTER
Donald Leslie William Brooks, Ashtead, England, assignor to Ronson Corporation, Woodbridge, N.J.
Filed Sept. 24, 1976, Ser. No. 726,188
Claims priority, application United Kingdom, Sept. 30, 1975, 40042/75
Int. Cl.[2] B65D *43/14, 51/04*
U.S. Cl. 220—339 13 Claims

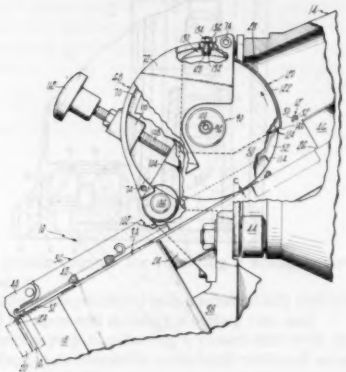


1. A cover for a recess in a battery-operated cigarette lighter, said cover comprising an integral body formed of plastics material, said body comprising a plate-like closure section for the recess and said closure section having a first portion which constitutes a flap movable between a closed position and an open position, a second portion connected to the first portion by means of a region of reduced thickness such that the first and second portions are hinged with respect to each other and together form the closure section for the recess, means associated with said second portion for releasably securing the second portion within the recess in the lighter, and electrically conductive spring means associated with said second portion for retaining a part in place within the lighter and for providing an electrical connection therefor.

4,040,542
CLEARING WHEEL ASSEMBLY FOR THREAD ROLLING MACHINE AND THE LIKE
James Francis Gibb, Terryville, Conn., assignor to The Hartford Special Machinery Company, Simsbury, Conn.
Filed Oct. 28, 1975, Ser. No. 626,365
Int. Cl.[2] B65H *9/00*
U.S. Cl. 221—162 1 Claim

1. Apparatus for feeding headed work blanks of small size to a work station and comprising a rotary hopper for tumbling the work blanks, the hopper having a discharge opening, a pair of feed rails for receiving blanks from the hopper to be fed to the work station, the feed rails defining a track for supporting the head of each blank with its shank received between the rails, the track having an input end located within the hopper with the track extending through the discharge opening, a pair of clearing wheels spaced apart side-by-side and coaxially supported for rotation adjacent the hopper in aligned relation to the track, the clearing wheels received within the discharge opening and located in part within the hopper in elevated spaced relation to the track to define a predetermined minimum clearance therebetween sufficient to permit the head of a blank to pass under the clearing wheels in a direction generally opposite the angular direction of rotation of the clearing wheels adjacent the track when the blank is properly oriented with its head seated on the track, the clearing wheels each

having a circumferentially extending peripheral rim with a knurled surface pattern providing a gripping surface for clearing improperly oriented blanks from the input end of the track while preventing blank trapping or lodging within the rim, and a shield having an arcuate cover plate and a flat mounting plate secured to the cover plate in perpendicular relation thereto for mounting the shield in fixed relation to the clearing wheels, the cover plate circumferentially extending about arcuate portions of the clearing wheels located within the hopper in interfering relation to the path of movement of blanks being driven out of the hopper discharge opening under the driving force of the



rotating clearing wheels, the cover plate being spaced outwardly from said arcuate portions of the clearing wheels located within the hopper and defining a radial clearance between the clearing wheels and the shield cover plate, said radial clearance being less than the shank diameter of the blanks being handled, the flat mounting plate of the shield being located within the space between the clearing wheels within the hopper above the track and substantially filling space to reduce the clearance between the shield plate and the wheels to a dimension less than the shank diameter of the blanks being handled.

4,040,543

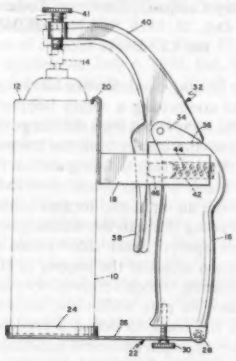
ADJUSTABLE AEROSOL CAN HOLDER

Rafael Guillen, 2826 18th St., National City, Calif. 92050

Filed Dec. 11, 1975, Ser. No. 639,791

Int. Cl.[2] A47G *19/14*

U.S. Cl. 222—473 **1 Claim**



1. A holder and dispenser for a cylindrical pressurized canister having an upper rim and a firing head comprising:

a. an elongated handle;

b. a hooked member mounted to said handle for engaging the upper rim of a pressurized cannister;

c. a clamp element pivotally mounted on said handle for engaging the bottom of said cannister and a set screw passing through said clamp element and threadably engaging said handle to force said clamp element towards said hooked member to engage a pressurized cannister therebetween and such that the spacing between said clamping element and hooked member is variable;

d. an actuator pivotally mounted to said handle and having an arm extending into adjacency with said firing head for firing same and a trigger element extending along said handle in spaced relation thereto; and

e. a variably extendible firing head depressor mounted in the distal end of said actuator arm to fire said cannister upon moving said actuator, whereby a plurality of cannisters of different rim-to-firing head spacing may be accommodated and the cannister may be temporarily set in its dispensing mode.

4,040,544

MATERIAL DISPENSER WITH SNAP-ACTING OUTLET VALVE

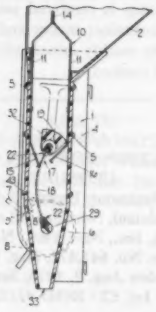
David Higgins, Stratford upon Avon, England, assignor to William Ernest Golcher, Walsall, England

Filed Jan. 21, 1976, Ser. No. 650,845

Claims priority, application United Kingdom, July 19, 1975, 30356/75

Int. Cl.[2] B65D *47/20*

U.S. Cl. 222—477 **10 Claims**



1. A dispensing apparatus comprising a container for material to be dispensed, an outlet spout from said container through which a quantity of material to be dispensed can be discharged, valve means including a curved blade spring movable across the spout between first and second positions in each of which it partially closes the spout, and a valve element connected to the blade spring and movable simultaneously therewith across the spout in a generally opposite direction to the spring between first and second positions in each of which it completes closure of the spout, and operating means connected to the blade spring and operable to deform the blade spring in a direction away from one towards the other of its first and second positions until the blade spring reaches a position from which it snaps rapidly across the spout to its said other position, causing simultaneous movement of the valve element to the other of the valve element positions, whereby a quantity of material is able to pass through the spout during movement of the spring and element thereacross.

4,040,545

CLOTHING HANGER GUARD

Andrew Joseph Hill, Long Beach, Calif., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed July 7, 1975, Ser. No. 593,655
Int. Cl.[2] A47J *51/098*
U.S. Cl. 223—85 **1 Claim**

1. A clothing hanger shaped for the support of articles of clothing which may be hung from said hanger, including a curved hook section of the hanger which is shaped so as to support the hanger and any clothing attached on the hanger when the hook section is grasped or fixed, together with

a protector member detachably mounted about the curved wire of the hook section of the hanger, said protector member serving to reduce the lifting stress, applied in bearing, to the hook section of the hanger, when the hanger is held from the hook section,

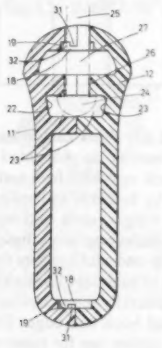
said protector member being a tube of circular cross-section of a larger outer diameter than the wire of the hook section of the hanger, in which the protector is fabricated of a tube of flexible plastic material which is softer than the wire of the hook section of the hanger, said tube slitted along its length, in which the protector member is formed of a hollow tube closed at one end of the tube to form a closed tip at said end, with the slit of the tube terminating short of the said closed tip.

4,040,546

HOLLOW PLASTIC GARMENT HANGER

Johannes Liebscher, Nassau, Lahn, and Rolf G. Schulein, Singhofen, both of Germany, assignors to Leifheit International Gunter Leifheit GmbH, Nassau, Lahn, Germany

Filed Dec. 8, 1975, Ser. No. 637,857
Claims priority, application Germany, Dec. 6, 1974, 2457738
Int. Cl.[2] A47J *51/097*
U.S. Cl. 223—88 **14 Claims**



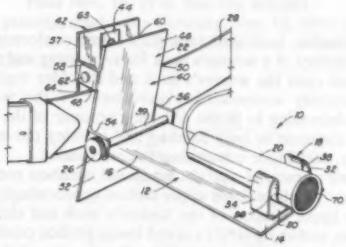
1. A hanger, comprising an elongated hanger body including a plurality of shell-shaped hanger halves separated from one another substantially in a longitudinal plane of symmetry of said hanger body, each of said shell-shaped halves having a raised peripheral edge portion bounding a recess which has an inner wall surface, said recesses together forming a hollow interior of said hanger body when said hanger halves are connected together; means for connecting said shell-shaped hanger halves to one another to form said hanger body, said connecting means including a plurality of mating male and female connecting portions formed at a plurality of locations interspersed over the entire inner wall surface of said recesses of the respective halves, said connecting portions of the respective hanger halves matingly engaging one another when said hanger is assembled and extending across said hollow interior of said hanger body so as to simultaneously connect said hanger halves with one another and to impart rigidity to the hanger body at said plurality of locations whereby to reinforce it against flexing; and at least one hook-shaped suspension element connected to said hanger body.

4,040,547

APPARATUS FOR HOLDING A MICROPHONE

Ralph E. Dickey, 821 North Walnut, Box 267, Medicine Lodge, Kans. 67104

Int. Cl.[2] A45F *5/02*
U.S. Cl. 224—5 H **1 Claim**



1. An apparatus for holding a microphone, the apparatus comprising:

a flat angular shaped base having a first end portion and a second end portion, the second end portion of said base folded into a hollow cylindrical portion;

a U-shaped clip, said clip having a bottom portion secured to the top of the first end portion of said base, and side portions extending upwardly from the bottom portion, the ends of the side portions folded over and positioned facing each other, the space between the side portions being smaller than the diameter of the microphone so the microphone may be received therebetween and retained in a press fit;

a spring biased clip for releasably engaging an article of clothing worn by the user of the microphone, said spring biased clip including;

a first member having an upper portion with a pair of ears extending rearwardly from the opposite sides of the upper portion, and a lower portion having a pair of ears extending outwardly from the opposite sides of the lower portion and having apertures therein,

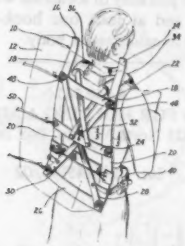
a second member having an upper portion with a pair of ears extending outwardly from the opposite sides of the upper portion, the ears pivotally attached to the ears of the upper portion of the first member.

a U-shaped leaf spring, one end of the leaf spring attached to the upper portion of the second member, the other end of the leaf spring biased against the upper portion of the first member; and

a threaded bolt slidably received through the hollow cylinder portion of the second end portion of said base and slidably received through the apertures in the ears of the lower portion of the first member of said spring biased clip for receiving a locking nut, whereby by loosening said locking nut on said bolt, said base and microphone may be

pivoted relative to said spring biased clip and locked again in a desired angular orientation.

4,040,548
FLEXIBLE BACK PACK FRAME
Joe H. Guglielmo, 340 Pinal St., Globe, Ariz. 85501
Filed Mar. 17, 1976, Ser. No. 667,636
Int. Cl.[2] A45F *3/00*
U.S. Cl. 224—25 A **2 Claims**



1. A flexible, laminated back pack frame conforming to the dual curvature of a wearer's back for supporting and distributing a load over the wearer's back and shoulder region while simultaneously accomodating movement of the wearer by readily deforming to fit the changing contour of the wearer's back in response to both bending and twisting movements of his body, said frame comprising in combination:

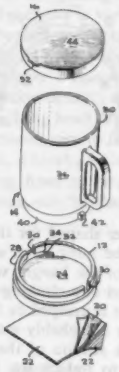
a. a pair of parallel, upright laminated members each having an outwardly curved upper section conformingly fitted to the upper portion of the wearer's back and shoulder region, and an inwardly curved lower portion conformingly fitted to the lower position of the wearer's back, said upright members comprising a laminate having a first ply of glass reinforced plastic positioned adjacent the wearer's back, a second ply of glass reinforced plastic and a wooden filler ply of glass reinforcedplastic and a wooden filler ply situated between and bonded to said glass reinforced plastic plys, said laminate being continuously flexible into a conforming relationship with the wearer's back in response to body movements;

b. upper, central, and lower laminated horizontal crosspieces, each individually bonded to and spanning said upright members, said crosspieces having a curvature conforming to the lateral curvature of the wearer's back at the respective locations of each of said crosspieces; and

c. first and second diagonal brace members extending diagonally between said upright members, said diagonal brace members intersecting at a position adjacent the middle of said second crosspiece and having a curvature conforming to the adjacent curvature of the wearer's back; whereby the back pack frame readily and continuously conforms to the contour of the wearer's back in response to both bending and twisting motions of his body and thereby distributes the load over the wearer's back and shoulder region.

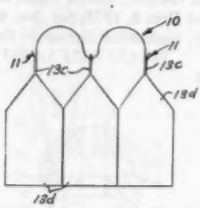
4,040,549
THREE IN ONE CAR CUP AND HOLDER
Clyde John Sadler, 207 Lansing, Lynchburg, Va. 24503
Filed May 27, 1975, Ser. No. 580,884
Int. Cl.[2] B60N *3/10*
U.S. Cl. 224—29 G **2 Claims**

1. A non-spilling cup and coin holder assembly for mounting in vehicles or the like, said assembly comprising a holder having a bottom with an upwardly projecting side wall forming an inner bore, said inner bore having generally vertical slots connecting with circumferential slots extending from the vertical slots, an adhesive attachment means for fastening the holder to the dashboard of the vehicle, a cup having an upper lip and a generally cylindrical base of a diameter smaller than the diameter of said inner bore and insertable into said inner bore, said cup having outwardly directed tabs insertable into said vertical slots and circumferential slots, and a cover means having an internal diameter slightly larger than both the cup's upper lip and the holder's side walls and being selectively attachable to said upper lip of the cup or to an upper portion of



said upwardly projecting sidewall of said holder when said cup is not positioned in said holder thereby providing a covered cup which is securely held in position by the holder to prevent any spilling from the cup and also to provide a covered holder for retaining coins and the like when the cup has been removed from the holder and the cover means has been attached to the holder.

4,040,550
BEER CASE AND SOFT DRINK CARTON CARRIER STRAP
Bernard L. Kleinert, 56937 State Road 123, South Bend, Ind. 46619
Int. Cl.[2] B65D *33/06*
U.S. Cl. 224—45 P **1 Claim**



1. A beer can and soft drink carton carrier strap assembly, comprising in combination, an elongated flat strap made of a flexible material, each opposite free end of said strap being permanently affixed by means of a plurality of rivet fasteners to one end of a metal hanger, each said metal hanger having a generally U-shaped transverse bend thereacross, said opposite free ends of said strap and said hangers together each forming a hook, an end edge of each said hook extending parallel to an axis of said bend, a generally semi-circular notch along a center of at least one of said hook end edges for engaging around a bottle neck below a crown cap for removal of said cap, said at least one of said hangers having a length that is less than a transverse width thereof whereby said hanger may be held in the palm of a hand adjacent the strap end such that a downward force applies leverage so as to remove said crown cap; said hangers at opposite ends of said assembly being engageable in handle openings provided on beverage cartons while said strap is slidable through said carton handle of an interme-

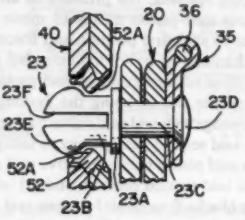
diate carton when more than two such cartons are carried adjacent each other.

4,040,551

SKI AND SKI POLE CARRIER

Andrew L. Brumbaugh, Rte. No. 1, Wyalusing, Pa. 18853

Filed June 2, 1976, Ser. No. 692,102
Int. Cl.² B65D 71/00
U.S. Cl. 224—45 S 9 Claims



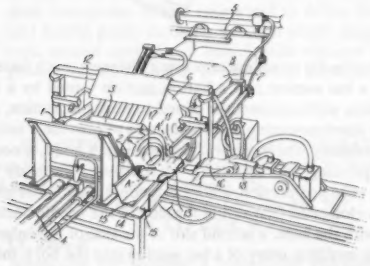
1. A transporting device for skis and ski poles, said device comprising an upper clamping assembly interconnected to a lower clamping assembly, said upper clamping assembly and said lower clamping assembly each including at least one ski pole clamp pivotably and releasably secured to at least one ski clamp, said at least one ski clamp is pivotably and releasably secured to at least one pole clamp by means of a lug passing through apertures within said ski clamp and said pole clamp, said lug including a shoulder portion positioned between said ski clamp and said pole clamp with a large diametered shank portion extending through the aperture in said pole clamp and being secured thereto by an enlarged head portion and an oppositely extending smaller diametered shank extending through the aperture in said ski clamp and being secured thereto by a flanged portion.

4,040,552

STRIPPING FLASH FROM BLOW MOULDED HOLLOW CONTAINERS

Robert W. Taylor, Bletchley, England, assignor to Plysu Limited, England

Continuation of Ser. No. 468,384, May 9, 1974, abandoned. This application Apr. 9, 1976, Ser. No. 675,634
Claims priority, application United Kingdom, May 18, 1973, 23818/73
Int. Cl.² B26F 3/02
U.S. Cl. 225—1 4 Claims



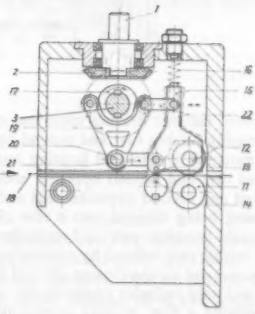
1. A device for stripping a fin-like flash projecting substantially perpendicularly from a surface of a blow-moulded hollow container, comprising: means for locating a container at a stripping station with the fin-like flash located in a first plane and the surface of the container from which the flash is projecting located in a second plane, and a powered stripping tool which includes two parallel stripping jaws, the tool being mounted for reciprocation with the two jaws reciprocating on opposite sides of the said first plane, the forwardmost portion of each jaw which first engages the flash including a stripping surface which is acutely inclined firstly with respect to both the first and second planes and also with respect to a third plane perpendicular to both the first and second planes whereby, when the said stripping surface engages the flash, the resulting force on the flash includes a first component urging the flash out of the path of the tool in the direction of travel, a second component urging the flash out of the path of the tool and away from the said surface of the container and a third component urging the flash out of the path of the tool and inwardly toward the other stripping jaw.

4,040,553

INTERMITTENT STOCK FEED MECHANISM

Martin Götz, Sersheim, Germany, assignor to Erich Grau Stanzwerk fur Elektrobleche, Sersheim, Germany

Filed Nov. 10, 1975, Ser. No. 630,264
Claims priority, application Germany, Nov. 16, 1974, 2454514
Int. Cl.² B65H 17/22
U.S. Cl. 226—151 6 Claims



1. A feeding mechanism for intermittently feeding stock to a processing machine, comprising

a rocker lever having at its outer end a gear segment,

a crank drive, including a crank which is operatively connected to said rocker lever, said crank drive being operable to impart an oscillation to said rocker lever,

a feeding clamp, comprising first and second, reversably rotatable, toothed feed rollers arranged to mesh with each other when said feeding clamp is closed, said first feed roller being in mesh with said gear segment,

a retaining clamp for holding said stock in position, said retaining clamp and said feeding clamp defining a stock path,

said retaining clamp comprising first and second clamping jaws, disposed on the same sides of said stock path as said first and second feed rollers respectively,

a forked lever carrying said second feed roller and said second clamping jaw,

a cam wheel operatively connected to said crank drive, said cam wheel positively controlling said forked lever, to cyclically open and close said feeding clamp and said retaining clamp, in alternation,

a pivoted roller bearing extending around and engaging said cam wheel and pivotable thereby, and

means comprising a lever and a link for linking said double roller bearing to said forked lever, so that said double roller bearing controls said forked lever.

4,040,554

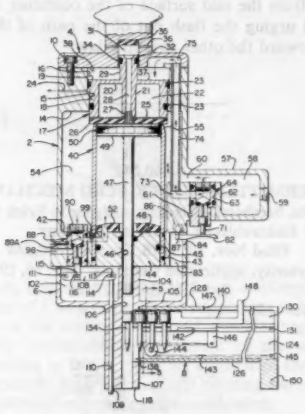
PNEUMATIC APPARATUS

Harry M. Haytayan, Sunnyside Lane, Lincoln, Mass. 01773

Continuation-in-part of Ser. No. 547,221, Feb. 5, 1975, abandoned, which is a continuation-in-part of Ser. No. 496,453, Aug. 12, 1974, and a continuation-in-part of Ser. No. 312,665, Dec. 6, 1972, abandoned. This application Dec. 4, 1975, Ser. No. 637,571

Int. Cl.[2] B25C *1/04*

U.S. Cl. 227—8 **43 Claims**



1. An improved fastener driving apparatus comprising:

a hollow housing having first and second opposite ends;

a cylinder mounted within said housing and extending between said first and second opposite ends, said cylinder having first and second opposite ends and the interior of said housing being divided into a first chamber located between said housing and said cylinder and a second chamber within and defined by said cylinder;

first and second end means closing off said first ends of said housing and said cylinder respectively, said second end means defining a first opening communicating with the interior of said cylinder;

a hammer disposed so as to be movable lengthwise through said first opening between a first retracted position and a second extended position;

a piston slidably mounted within said cylinder for driving said hammer from one to the other of its said first and second positions;

a first passageway communicating with the interior of said cylinder at said first end thereof,

third end means including a poppet valve closing off said second end of said housing, said poppet valve including a hollow valve casing and a poppet valve member comprising piston means slidably mounted in said valve casing for reciprocal movement between a first position wherein said poppet valve member is spaced from said cylinder and said second chamber is open to said first chamber via said second end of said cylinder and a second position wherein said poppet valve member engages said second end of said cylinder and closes off said second chamber from said first chamber;

a third chamber having an inlet for connection to a supply of pressurized air and an outlet communicating with said first chamber;

a second opening connecting said first passageway with said first chamber;

an exhaust port in said housing connecting with said first passageway;

a first control valve for selectively blocking flow of air between said first passageway and either said second opening or said exhaust port;

means defining at least one second passageway for transmitting air from said third chamber to the interior of said poppet valve casing so as to exert air pressure on said piston means in a direction to urge said poppet valve member to its said second position; and

a second control valve for selectively (a) blocking flow of air from said third chamber to said second passageway and for simultaneously venting air from said second passageway and said valve casing, whereby when said first control valve blocks flow of air between said first passageway and said second opening, the pressure of air in said first chamber forces said piston means to move said poppet valve member to said first position and forces said piston to drive said hammer to its second extended position, and (b) resuming flow of air to said second passageway from said third chamber and stopping the venting of air from said second passageway and said valve casing whereby (1) flow of air in said second passageway to said poppet valve casing causes said piston means to move said poppet valve member to its said second position and (2) when said first control valve blocks flow of air between said first passageway and said exhaust port said piston is forced under the pressure of air in said first chamber to drive said hammer back to its said first position.

4,040,555

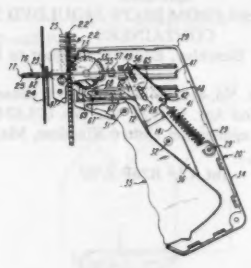
TAG ATTACHING APPARATUS

William A. Jenkins, Englewood, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Filed Mar. 26, 1976, Ser. No. 670,797

Int. Cl.[2] B25C *1/00*

U.S. Cl. 227—67 **20 Claims**

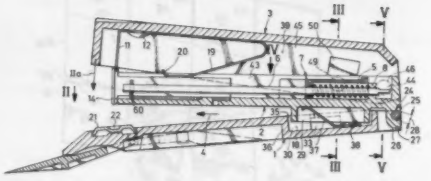


1. Apparatus for attaching tags using fasteners, each fastener including a bar section and a button section joined by a filament section, with a connector joined to each bar section, and means for interconnecting the connectors to provide a unitary fastener assembly, the apparatus comprising: a body, a needle having a piercing end extending outwardly of the body and having an enlarged portion, a bore extending lengthwise of the needle, an elongated first slot in the side of the needle communicating with the bore, a second slot in the side of the enlarged portion for enabling entry of a bar section into the bore, means for advancing the bar sections one-at-a-time into alignment with the bore, a knife inserted into the enlarged portion adjacent the bore, the knife having a cutting edge disposed opposite the piercing end, and a push rod engageable with the bar section to effect severing of the bar section from its respective connector by the cutting edge and for thereafter driving the bar section through the bore while the filament section of the fastener extends through the first slot.

4,040,556
HAND-OPERATED STAPLER

Gerald Dahle, Coburg, Germany, assignor to Wilhelm Dahle Buro- und Zeichengeratefabrik, Coburg, Germany

Filed July 22, 1976, Ser. No. 707,704
Claims priority, application Germany, July 31, 1975, 2534178
Int. Cl.[2] B25C 5/02
U.S. Cl. 227—120 12 Claims



1. In a hand operated, portable stapler composed of a first part constituting a base plate having an anvil at one end for bending staple legs, a second part constituting a staple magazine for holding a strip of staples and bringing each staple in succession into an ejection position at one end of the magazine, a third part constituting an actuating lever carrying a staple driver aligned with the ejection position, first connecting means pivotaly connecting the other end of the first part to the second part to permit the second part to pivot toward and away from the first part, second connecting means pivotally connecting the third part to the second part to permit the third part to pivot toward and away from the second part to enable the staple driver to drive successive staples in the ejection position, the first and second connecting means presenting parallel pivot axes, and at least one of the parts being provided with lateral guide surfaces to confine the pivotal movement of that part and a part connected thereto to the direction defined by the pivot axes, the improvement wherein:

each said connecting means comprises at least one pivot pin carried by one of said parts which it connects and the other of said parts which it connects is provided with at least one recess for each said pin, and at least one of said parts associated with each said connecting means is elastically deformable in the region of said connecting means for permitting said pin to be inserted into its respective recess by elastic deformation of at least one of said parts associated with said connecting means; and

said base plate is provided with a recess which opens toward said staple magazine and is defined by side walls which extend longitudinally of said base plate and which are directed toward said staple magazine, said side walls presenting surfaces which face one another to define longitudinal boundaries of said recess and to define first ones of said lateral guide surfaces, and said staple magazine presents second ones of said lateral guide surfaces which are guided by said first ones of said guide surfaces.

4,040,557
ELLIPTICAL SEAM WELDING APPARATUS

James S. Heverly, Upper Darby, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 23, 1976, Ser. No. 651,757
Int. Cl.[2] B23K 9/10
U.S. Cl. 228—9 7 Claims

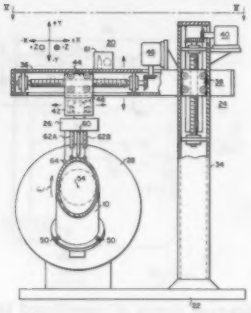
1. Apparatus for welding a complexly, convexly curved member, said apparatus comprising:

a welding torch;

means for rotating said convexly curved member at varying angular velocities to produce a predetermined generally constant linear speed relative to said torch;

a pair of probes disposed in a spaced relation to each other and to said torch, each probe abutting said convexly curved member and responding to variations in distance from a datum plane to produce a signal proportional to said variations;

means for moving said torch in X and Y directions in response to the signal from said probes to a point on said convexly curved member which point is successively the greatest distance from said datum plane;

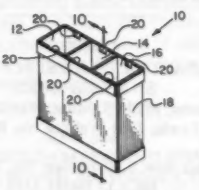


whereby said welding torch forms a weld pool adjacent said point to automatically form a uniform weld adjacent the periphery of said complexly, convexly curved member as said member rotates.

4,040,558
COMBINATION SHIPPING AND STORAGE CONTAINER AND METHOD

Robert A. Bamburg; Farris N. Duncan, both of West Monroe, and Roger M. Floyd, Monroe, all of La., assignors to Olinkraft, Inc., West Monroe, La.

Filed Mar. 11, 1975, Ser. No. 557,420
Int. Cl.[2] B65D 5/35, 5/02
U.S. Cl. 229—23 BT 19 Claims



1. A combination shipping and storage container comprising:

a. a removable and reuseable outer shell having at least an open bottom;

b. an inner container, positioned within said outer shell, said inner container having at least one product receiving cell; and

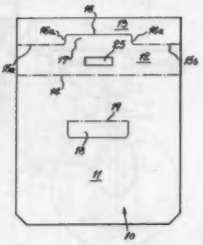
c. removing means, associated with said container, for removing said outer shell by lifting said outer shell upwardly from said inner container, said inner container being used to contain the products for storage purposes and said outer shell being reusable, and said removing means comprising in part a notch being formed in opposite sides of the upper portion of the inner container.

4,040,559

CARTON WITH SMOOTH REINFORCED HAND HOLE

Buddy E. Giebel, Monroe, Mich., assignor to Union Camp Corporation, Wayne, N.J.

Filed Nov. 15, 1976, Ser. No. 741,683
Int. Cl.[2] B65D *13/00, 5/46*
U.S. Cl. 229—23 R 4 Claims



1. In a Bliss-type carton of paperboard having the bottom and side walls secured to individual end walls the improvement in each end wall comprising:

a full height outer panel;

a hand hole cut out of the outer panel to provide a hand hole flap hinged along a top score line and reverse folded and secured to the inner surface of the outer panel;

an inner panel connected to the top of the outer panel along a first score line; and

an intermediate panel connected to the inner panel along end score lines spaced apart and in line with each other;

the inner and intermediate panels each having a height no greater than the distance between the top of the hand hole and the top of the outer panel;

a U-shaped cut out between the spaced end score lines formed by a straight line cut and end cuts, the outer ends of the end cuts running to the inner ends of the spaced end score lines to provide a recess in the intermediate panel and a projection from the inner panel;

the inner and intermediate panels being reverse folded above the hand hole and secured to the outer panel with the projection overlying and secured to the hand hole flap and the hand hole flap within the recess;

thereby providing a smooth hand hole and a triple layer reinforced area above the hand hole.

4,040,560

CARTON ADAPTED TO BE STACKED FLAT AND SNAPPED OPEN

Milton J. Grossman, 10296 S. Mina, Whittier, Calif. 90605, and Deanna Rose Lewis, 2061 Wallace No. B, Costa Mesa, Calif. 92627

Filed Nov. 8, 1976, Ser. No. 740,124
Int. Cl.[2] B65D *5/36*
U.S. Cl. 229—41 B 13 Claims

1. A flattenable carton, comprising:

four sides;

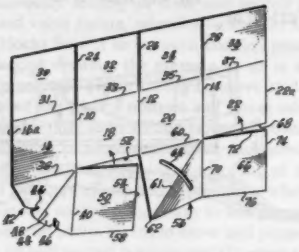
means forming a bottom for said carton, said means comprising a flap connected to one end of one of the sides, said flap having a tongue at the outer free edge and a score line extending from a lower corner of the side from which the tongue extends and along which said tongue is adapted to be folded;

a second flap having one edge connected to the first flap, there being a score line separating said flap, the other edges of said second flap being free;

a third flap connected to the side opposite the side to which the first flap is connected, said third flap having a generally diagonally arranged slot, and a score line extending diagonally of the third flap and intersecting said slot;

a fourth flap having one edge connected to a third flap along a score line, the other edges of the fourth flap being free;

when the carton is folded and flattened, the second and fourth flaps are secured to the inner surfaces of the respective adjacent sides, and the first and third flaps are folded



along their fold lines with the tongue of the first flap in alignment with the slot of the third flap; and

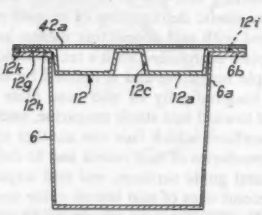
pressure on the outer corners of the folded and flattened carton causing the tongue to enter the trough of the slotted flap and enter the slot to complete the bottom of the carton.

4,040,561

PROCESS AND INSTALLATION FOR PACKING A LIQUID PASTY, OR GRANULAR PRODUCT AND A PACKING CONTAINER

Raymond C. Philippon, Saint-Cloud, France, assignor to Societe Anonyme dite: Etude et Realisation de Chaines Automatiques - ERCA, France

Filed Apr. 24, 1975, Ser. No. 571,204
Claims priority, application France, Apr. 25, 1974, 74.14503
Int. Cl.[2] B65D *5/64, 77/00*
U.S. Cl. 229—43 7 Claims



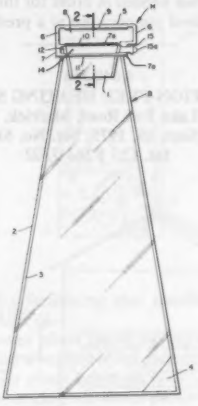
1. A packing container provided with a profiled closure lid and a guarantee sheet, the closure lid being sealed on a flat rim of the container and the guarantee sheet being sealed on the edge of the closure lid, the closure lid comprising a flat ring which is sealed to the flat rim of the container and whose outer periphery coincides with the outer periphery of the flat rim of the container, a flat dish rim being formed inside the flat ring and resting freely on an inner marginal zone of the flat rim of the container, the dish rim having an outer periphery of substantially the same shape as the inner periphery of the said flat ring, and being partially connected to the said flat ring by at least one attachment tongue made of the same material as the flat ring and the dish rim, said at least one attachment tongue being disposed in a straight line coinciding with one of the edges of the dish rim, the guarantee sheet being sealed on said flat ring.

4,040,562

PLASTIC BAG AND CARRIER HANDLE

Gregory A. Ward, Balboa Island, and Lawrence P. Casey, III, Garden Grove, both of Calif., assignors to Casard Industries, Inc., Newport Beach, Calif.

Filed Mar. 9, 1973, Ser. No. 339,504
Int. Cl.[2] B65D 33/06
U.S. Cl. 229—54 R 4 Claims



1. A container for the manual emergency transportation of a small quantity of fuel by a vehicle operator, comprising:

a pair of thin, flexible sheet members having a substantially trapezoidal surface configuration, said sheet members overlying one another, the edges of said sheets bonded together by a marginal seal which extends throughout substantially the entire length of the respective sides and base of said trapezoidal sheets but not the top thereof, the upper portion of said bonded pair of sheet members, removed from said base seam, forming a cone, truncated at said top, when said container is filled with fuel and inverted, the open truncated top of said cone being large enough to receive the standard nozzle used at filling stations for supplying fuel to said bag, the weight of fuel included in said container during use being progressively applied through said trapezoidal sheet members to said top when said container is carried, said top of said trapezoidal sheets sized to permit said top, when placed in the fill opening of an automobile when said container is inverted, to expand against said opening to form a tight fit with said opening to prohibit fuel leakage and thereby operate as a sealed funnel for the included fuel during discharge from the container; and

a handle including a grip portion adapted to be hand held by said operator and a sealing portion, said sealing portion including a gripping surface for frictionally engaging said flexible sheet members adjacent the top of said trapezoidal surfaces;

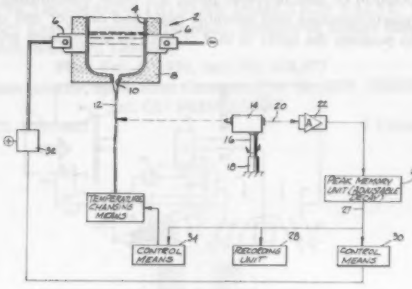
said top of said trapezoidal sheets wrapped around said sealing portion of said handle to press said pair of sheets adjacent said top against one another in sealing engagement between said gripping portion of said handle and a portion of said sheets removed from said top, so that the weight of said included fuel seals said top of said sheets together when said container is manually carried.

4,040,563

SYSTEM AND METHOD OF MONITORING THE PEAK TEMPERATURE OF A MOVING MASS

James Alfred Schairer, Richmond, Ind., assignor to Johns-Manville Corporation, Denver, Colo.

Filed Nov. 19, 1975, Ser. No. 633,529
Int. Cl.[2] C03B 5/24; G01J 5/02
U.S. Cl. 236—15 BC 7 Claims



1. A system for monitoring the peak temperature of a mass moving past a given area wherein the peak temperature changes location within the confines of the mass and of said area, comprising:

a. means for sensing the temperature of a portion of said mass which portion is located adjacent to a segment of said area, said sensing means being spaced from said mass and capable of emitting a first signal having a magnitude representative of the temperature of said mass at said portion, said first signal comprising peaks and valleys and magnitude differences therebeween,

b. means for oscillating said sensing means and thereby scanning said moving mass such that on each half cycle of oscillation said sensing means scans the peak temperature of the moving mass,

c. means for receiving said first signal and for generating a second signal that relates to at least the peak magnitude of that portion of said first signal received during each half cycle of oscillation, said receiving and generating means also having means for decaying the magnitude of said second signal at a desired rate between the times that the peak temperatures are sensed in sequential half cycles of oscillation by the sensing means, said second signal having peaks and valleys and magnitude differences therebetween, the magnitude differences of said second signal being much smaller than the corresponding magnitude differences of said first signal.

4,040,564

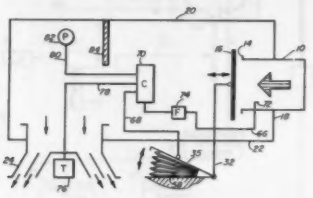
SYSTEM POWERED DAMPER AND CONTROL UNIT

William J. Waeldner, Waverly, and William J. Harris, Tunkhannock, both of Pa., assignors to Dynamics Corporation of America, New York, N.Y.

Filed Feb. 25, 1976, Ser. No. 661,323
Int. Cl.[2] F24F 13/10
U.S. Cl. 236—49 16 Claims

1. In a system powered damper and control unit for controlling air flow through a conduit in an air conditioning system; the combination comprising a damper movable between open and closed positions for controlling conduit air flow, means defining a seat engageable by the damper in its closed position to seal the conduit against air flow, an expansible and contractible bellows disposed externally of said conduit, a fixed plate disposed on one side of said bellows, a movable plate disposed on an opposite side of said bellows and pivotally mounted on a generally horizontal axis for swinging movement in one and an opposite direction on expansion and contraction of the bel-

lows, the weight of the plate bearing against and tending to contract the bellows for a gravity bias in said opposite direction and for damper opening movement, damper closing movement being effected by bellows expansion, pressure supply means interconnecting said bellows and conduit for a supply of air under pressure to the former, a control associated with said pressure supply means and bellows and operable to control bellows expansion and contraction and thereby determine the position of said movable plate, a motion transmitting device interconnecting said movable plate and damper and operable to position the latter in said conduit in accordance with plate

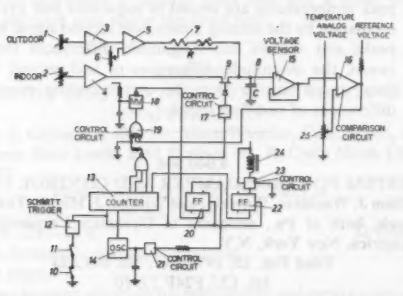


position, said last mentioned means including a floating connection with said damper for accommodating free damper movement about at least two discrete axes and thereby permitting slight damper adjustment for full closing thereof against said seat and sealing of the conduit, and a means for limiting plate movement in the bellows contracting direction while permitting free bellows and plate movement in the bellows expanding direction, said means thus serving to limit damper movement in the conduit opening direction whereby to maintain a predetermined minimum conduit pressure drop for bellows operation under low flow conditions.

4,040,565
CONTROL UNIT FOR THERMAL CONDITIONING SYSTEMS

Jorn Uffe Christiansen, Hvidovre Strandvej 48, DK-2650 Hvidovre, Denmark

Filed Apr. 20, 1976, Ser. No. 678,497
Claims priority, application Denmark, Apr. 21, 1975, 1715/75
Int. Cl.[2] G05D *23/00;* **F28D** *7/10*
U.S. Cl. 236—91 G **5 Claims**



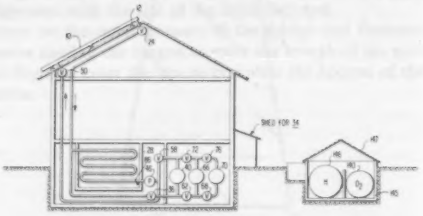
1. A central unit for shutting down and restarting a thermal conditioning system, such as for at least one building space, comprising:

a. a first voltage source responsive to outdoor temperature;
b. a second voltage source responsive to the temperature of at least one building element;
c. a resistor sized to be the analog of the thermal constants affecting said space;
d. a third voltage source responsive to indoor temperature in the space;
e. a condenser sized to be the analog of the capacity of the thermal conditioning system;
f. said first, second and third voltage sources and said resistor being connected together to form a charging network connected to said condenser;
g. a voltage sensor connected to said condenser;
h. a comparison circuit connected to said voltage sensor and to a preadjusted fourth voltage source representing the desired temperature;
i. a time clock switch; and
j. a time-determining network under the control of said time clock switch and said comparison circuit for energizing the system when needed in order for the building space to reach the desired temperature at a predetermined time.

4,040,566
POLLUTION-FREE HEATING SYSTEM

Carl Chiarelli, 20 Lake End Road, Merrick, N.Y. 11566

Filed Sept. 15, 1975, Ser. No. 613,492
Int. Cl.[2] F24J *3/02*
U.S. Cl. 237—1 A **6 Claims**



1. A system for heating a building and providing it with heated water for domestic use comprising in combination:

a. solar heating means, which includes
a heating panel comprising a plurality of is circulated; and
means mounted for exposure to sunlight, for intensifying the sunlight at said plurality of parallel pipes to thereby raise the temperature of the liquid circulated therein;
b. means mounting said solar heating means to the roof of the building;
c. heat exchange means to heat air circulated within the building from said liquid;
d. a liquid circulating means, which includes
a circulating pump for said liquid,
connecting means to deliver said liquid from an outlet of said circulating pump to an inlet of said heating panel.
connecting means to deliver said liquid from an outlet of said heating panel to an inlet of said heat exchange means, and
means to deliver said liquid from an outlet of said heat exchange means to an inlet of said circulating pump;
e. means for reducing heat loss from said heating panel during periods of little or no sunshine;
f. means for heating potable water for domestic use from said liquid;
g. a plurality of insulated liquid storage tanks, each having an inlet and an outlet;
h. inlet connecting means which connect said inlets of said storage tanks to said outlet of said liquid circulating pump;
i. outlet connecting means which connect said outlets of said storage tanks to said inlet of said heat exchange means;
j. valve means for each liquid storage tank, disposed in said inlet and outlet connecting means, whereby said liquid storage tanks can be successively connected to said circulating means; and
k. liquid temperature sensing means disposed within said heat exchange means, which successively opens said valve means for each liquid storage tank at a different predetermined high temperature for each liquid storage tank, and closes all valve means for each liquid storage tank at a

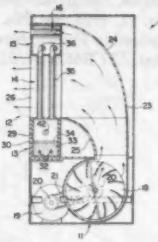
single predetermined low temperature of said liquid in said heat exchange means.

4,040,567

HEATING UNIT

Charles D. McNeely, Uniontown, Ohio, assignor to NEPRO, Inc., Uniontown, Ohio

Division of Ser. No. 544,276, Jan. 27, 1975, Pat. No. 3,941,311. This application Oct. 8, 1975, Ser. No. 620,769
Int. Cl.[2] F24D 1/02
U.S. Cl. 237—81 4 Claims



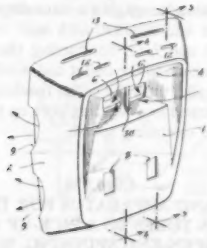
1. A method for facilitating heat transfer in a heating unit comprising the steps of:
providing a lower phase liquid having a specific heat less than unity and a boiling point greater than 200° F;
floating an upper phase liquid upon the lower phase liquid;
heating and vaporizing the lower phase liquid whereby the vapor percolates through said upper phase liquid; and,
circulating the vapor of the lower phase liquid throughout the heating unit to transfer heat.

4,040,568

DISPENSER FOR VAPORIZABLE MATERIAL ACCENTUATED BY AMBIENT AIR FLOW

Stanley I. Mason, Jr., Weston; Michael D. Handler, Bridgeport, and James E. Richardson, Weston, all of Conn., assignors to Simco, Inc., Weston, Conn.

Filed Sept. 15, 1975, Ser. No. 613,308
Int. Cl.[2] A61L 9/04
U.S. Cl. 239—57 12 Claims



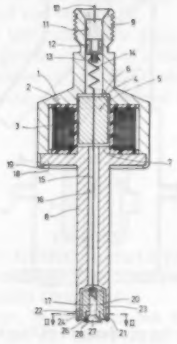
1. A dispenser for releasing volatile material in the presence of surrounding air movement, said dispenser including,
a pair of similar containers, each containing volatile material, said containers each having an opening at one end thereof and a partitioned container extension proximate to said opening, said extension being concave towards said opening,
a housing having an air inlet on one surface thereof and an air exit,
means for mounting said containers in said housing with part of each said extension facing and opening to said air inlet, and so the remaining portion of said extension facing the inside surface of said housing and defining a gap therebetween,
whereby ambient air may enter one side of each said container extension, pass into said container and leave, carrying volatile material, out the other side of said container extension.

4,040,569

ELECTRO-MAGNETIC FUEL INJECTION VALVE

Heinrich Knapp, Leonberg, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

Filed Feb. 6, 1976, Ser. No. 655,877
Claims priority, application Germany, Feb. 26, 1975, 2508390
Int. Cl.[2] F02M 51/08
U.S. Cl. 239—467 7 Claims



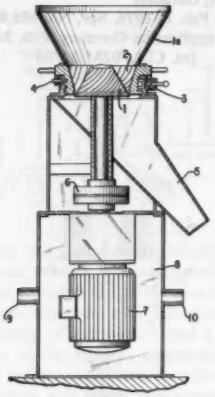
1. In an electro-magnetic injection valve for timed low pressure fuel injection systems of internal combustion engines utilizing induction tube injection, including; a housing; a stationary iron core located within the housing; a fixed magnetic winding supported within the housing by the iron core; an armature-plunger mounted within the housing in co-axial relationship with the iron core, said armature-plunger being immersed by the fuel within the housing; a hollow stem connected to the housng; means within the hollow stem which define a valve seat; and a valve needle connected to the armature-plunger and forming an injection nozzle with the valve seat, the improvement comprising: a non-rigid wire rod which connects the valve needle to one end of the armature-plunger, said rod being immersed by the fuel within the valve; tension means connecting the other end of the armature-plunger to the housing, said tension means and the fuel pressure at the valve needle placing the non-rigid wire rod and armature-plunger under tension; and a plurality of bores formed within the valve seat defining means which are dimensioned to determine the apportionment of fuel by the injection nozzle and are appropriately disposed to transform the pressure energy associated with the fuel apportionment into kinetic energy for utilization in the preparation of the fuel, wherein:
i. the valve seat defining means is formed as a hollow member within the free end of the hollow stem where it is immersed by the fuel within the valve, said hollow member having a central axis about which a circumferential surface lies which defines an annular cylindrical space with the interior wall of the hollow stem;
ii. the plurality of bores comprising two mutually parallel disposed bores each serving as a throttle and each being formed within the wall of the hollow member to extend inwardly toward the central axis, with each bore being disposed at the same distance from the central axis; and
iii. the valve needle is lifted outwardly from its valve seat by the movement of the armature-plunger and non-rigid wire rod as a unit.

4,040,570

PREPARATION OF UNIFORM BLACK POWDER GRANULES

Wolfgang Wiedemann, Dulmen, and Friedrich Platte, Recklinghausen, both of Germany, assignors to Wasag Chemie GmbH, Munich, Germany

Continuation of Ser. No. 281,622, Aug. 18, 1972, abandoned.
This application July 11, 1975, Ser. No. 595,221
Claims priority, application Germany, Aug. 31, 1971, 2143443
Int. Cl.[2] B02C *19/12*
U.S. Cl. 241—3 2 Claims



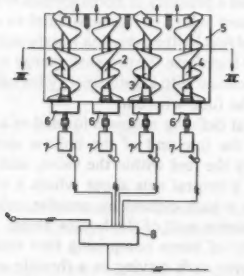
1. A method for the production of black powder granules of a given uniform grain size comprising compressing black powder meal, coarse crushing the compressed black powder and grinding the coarse ground black powder particles with little relative movement of the particles to each other in a gap between a conical, spirally grooved rotor and a conical, oppositely spirally grooved stator.

4,040,571

METHOD OF CONVEYING AND DESINTEGRATING REFUSE AND THE LIKE, AND APPARATUS FOR CARRYING OUT THIS METHOD

David Georg Lindeborg, Blomstermala, Sweden, assignor to Norba Aktiebolag, Blomstermala, Sweden

Continuation of Ser. No. 571,518, April 25, 1975, abandoned.
This application Sept. 17, 1976, Ser. No. 724,309
Claims priority, application Sweden, May 3, 1974, 7405908
Int. Cl.[2] B02C *19/22*
U.S. Cl. 241—30 9 Claims



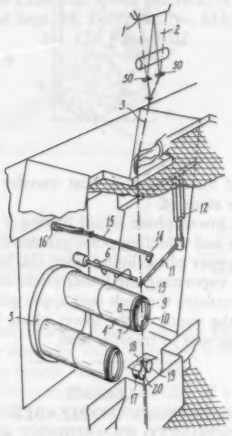
1. Method of conveying and disintegrating composite goods such as refuse comprising the steps of (1) advancing said goods through a chamber by rotating in said chamber a plurality of mutually cooperating, substantially parallel rotatable feed screws which define therebetween axially extending interspaces, said rotation being in the axial direction of said feed screws; and (2) cyclically intermittently reversing the direction of rotation of at least one of said feed screws relative to at least one other of said feed screws according to a predetermined program, whereby to temporarily feed part of the goods backwards.

4,040,572

STRAND ATTENUATION AND WINDING APPARATUS AND METHOD

Giuseppe-Fabrizio Mario Melan, Chambery, and Jean Raymond Nicoulaud, Challe-les-Eaux, both of France, assignors to Saint-Gobain Industries, Neuilly-sur-Seine, France

Filed Nov. 11, 1975, Ser. No. 630,925
Claims priority, application France, Nov. 13, 1974, 74.37434
Int. Cl.[2] B65H *54/02*
U.S. Cl. 242—18 A 22 Claims



1. A method of starting the winding of a continuous strand on a rotating collet comprising, positioning a portion of the strand in proximity to an end face of the collet, continuously drawing the strand under tension across the end face of the collet in a manner such that portions of the strand extend beyond two points on the periphery of said end face, engaging the strand with strand engaging means disposed on said end face of the collet and aligned with said two points on the periphery of said end face, conducting the strand from the strand engaging means to the collet and winding the strand on a portion of the collet until the collet reaches operating speed, and shifting the strand to a winding core on the collet after the collet has reached operating speed.

4,040,573

METHOD OF AND APPARATUS FOR TRANSPORTING EMPTY BOBBIN TUBES TO A PICK-UP AND DELIVERY STATION IN OPEN-END SPINNING, WINDING, YARN TEXTURING AND SIMILAR MACHINES

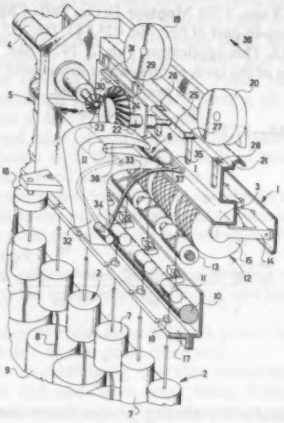
František Buryšek, Usti nad Orlici; Karel Mikulecký, Chocen, and Jan Janoušek, Brandys nad Orlici, all of Czechoslovakia, assignors to Vyzkumny ustav bavlnarsky, Usti nad Orlici, Czechoslovakia

Filed Aug. 16, 1976, Ser. No. 714,778
Claims priority, application Czechoslovakia, Aug. 28, 1975, 5860/75
Int. Cl.[2] B65H *54/26, 67/06*
U.S. Cl. 242—35.5 A 3 Claims

1. A method of conveying empty bobbin tubes through a channel member extending along a plurality of working units of open-end spinning, winding, yarn texturing and similar

machines having a transporting member adapted to automatically exchange a fully-wound bobbin for an empty bobbin at a bobbin withdrawing and supply station, comprising the steps of

moving a plurality of empty bobbins along said channel member in an end-to-end column formation in a stepwise manner, said transporting member also moving in a stepwise manner along said channel member,



said transporting member pushing said end-to-end column formation of empty bobbin tubes along said channel member a distance corresponding to a fraction of its stepwise movement and the distance of each step corresponding to the distance between adjacent working stations,

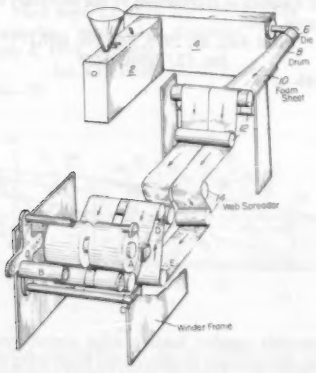
whereby the leading empty bobbin tube of said column formation is positioned at the next following bobbin withdrawing and supply station from which it is subsequently withdrawn by said transporting member.

4,040,574

METHOD AND APPARATUS FOR REPLACING A ROLL OF POLYSTYRENE FOAM SHEET WITH EMPTY CORE ROLL

David Emil Johnson, Macedon, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Mar. 10, 1976, Ser. No. 665,486
Int. Cl.[2] B65H *19/20*
U.S. Cl. 242—56 A **6 Claims**



1. In an arrangement for forming mill rolls of polystyrene foam sheet material, the method for replacing a full mill roll with a core roller and transfer of a severed end of said sheet material to said core roller which comprises

a. automatically actuating rotating drives connected to a full roll of sheet material and a core roll arranged opposite one another in the turret of a winder frame when the full roll reaches a preselected diameter and without interrupting the winding of the sheet material,

b. rotating the turret to replace the full roll winding position with said core roller,

(b-1) bringing continuously advancing sheet into contact with said core roller,

c. raise a driven sheet material lay-on roller in nipping engagement with said core roll and thereafter sever the web of the sheet material with a horizontal knife sufficiently encompassing the core roller to direct a severed end of said sheet material in nipping engagement between said lay-on roller and said core roller,

d. retracting the horizontal knife from contact with said sheet material during winding of a full roll thereof and,

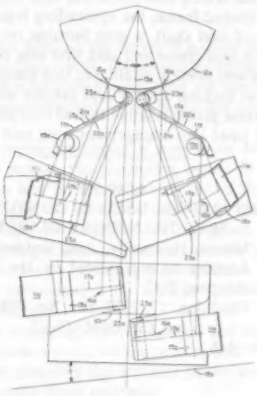
e. initiating the sequence of step (a) above when a preselected roll diameter of sheet material is formed.

4,040,575

TAPE GUIDING STRUCTURE

Dennis M. Ryan, Redwood City, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Filed Apr. 29, 1976, Ser. No. 681,468
Int. Cl.[2] B65H *27/00*
U.S. Cl. 242—76 **5 Claims**



1. Structure for guiding at least one shank of tape between a cylindrical drum on which the tape is helically wrapped, and a number of first cylindrical guides normal to a predetermined reference plane, the drum being tilted with respect to the reference plane, and the tape centerline on the first cylindrical guide being parallel to the reference plane, comprising:

at least one second cylindrical guide for said tape shank, each second guide having a sector thereof engaging the respective shank of tape between the drum and the first guides;

said second guides being mounted with the generatrices thereof that lie in the tape engaging sectors thereof oriented to be perpendicular to the tape centerline around the sector; and

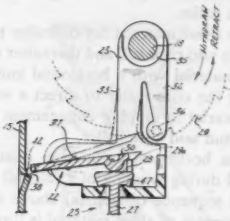
at least one of said second guides having tape edge-guiding flanges formed thereon in planes normal thereto.

4,040,576

RETRACTOR LOCK AND PAWL SADDLE THEREFOR

Ronald Jay Walker, Sterling Heights; Dewayne James Sherwin, Imlay City, and Robert John Rumpf, Grosse Pointe, all of Mich., assignors to The Firestone Tire & Rubber Company, Akron, Ohio

Filed Dec. 10, 1975, Ser. No. 639,472
Int. Cl.[2] A62B 35/00; B65H 75/48
U.S. Cl. 242—107.4 A 5 Claims



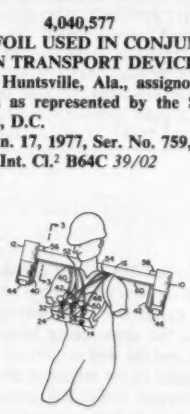
1. A retractor lock and pawl saddle structure for seat belt retractors comprising:
- a saddle made from a resin plastic having bifurcated arms to form a first arm portion and a second arm portion pivotal relative to said first arm portion;
- a pawl element pivotally supported solely by said saddle in the second arm portion;
- a retractor drum for selected retraction and withdrawal of seat belt webbing therefrom;
- a ratchet wheel rotatable with said drum and secured against withdrawal rotation when said pawl is engaged thereagainst;
- a shaft about which said drum and said wheel rotates; and
- a channel shaped frame, the upstanding legs of said frame in support of said shaft, a stop buttress on said frame, and means on said frame and said first arm portion for fixing said first arm portion relative to said frame, whereby upon said pawl locking against said ratchet wheel said second arm portion pivots relative to said first arm portion bringing said pawl into engagement with said stop buttress.

4,040,577

LOCKWOOD AIRFOIL USED IN CONJUNCTION WITH MAN TRANSPORT DEVICE

Thomas M. Moore, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 17, 1977, Ser. No. 759,937
Int. Cl.[2] B64C 39/02
U.S. Cl. 244—4 A 4 Claims



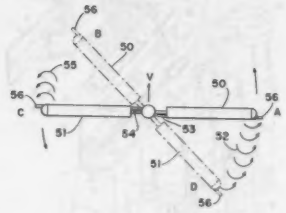
1. A device for transporting an individual in the atmosphere comprising a pair of jet engines interconnected by a wing structure that has openings therein for the blowing of a fluid chordwise over the wing to increase lift of the device and thereby the range of the device, said wing structure being attached to a back plate with a harness connecting said back plate to a front control panel for mounting the device on an individual, said front control panel having means thereon for controlling the starting of the jet engines and three control actuators interconnected to means at the jet engines for controlling exhausting forces from the jet engines, for controlling the amount of fuel supplied to the jet engines and for controlling fluid flow from a high pressure side of the jet engines to said openings in the wing structure.

4,040,578

ROTOR VORTEX CONTROL

Shao Wen Yuan, 6701 Montour Drive, Falls Church, Va. 22043

Continuation-in-part of Ser. No. 425,143, Dec. 17, 1973, Pat. No. 3,936,013. This application Feb. 2, 1976, Ser. No. 654,695
The portion of the term of this patent subsequent to Feb. 3, 1993, has been disclaimed.
Int. Cl.[2] B64C 23/06
U.S. Cl. 244—17.19 5 Claims



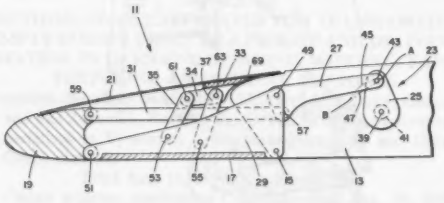
1. Apparatus for abating jet-circulation-control helicopter rotor-blade tip vortices formed at the tip of a blade when it is in fluid stream flowing relative to said blade, said vortex being formed as a result of a difference in fluid pressure on one side of the blade relative to the fluid pressure on the opposite side of the blade which causes a rush flow of fluid from the side of higher pressure to the side of lower pressure, said apparatus comprising a jet-circulation-control rotor blade system having at least a pair of blade tips, a source of pressurized fluid, a plurality of jetting means, and means connecting said jetting means to said source of pressurized fluid, each of said plurality of jetting means being located outwardly of a respective one of the said tips for emitting pressurized fluid from said jetting means in the direction toward said side of higher pressure and in a plane substantially perpendicular to the direction of flow of said fluid stream.

4,040,579

VARIABLE CAMBER LEADING EDGE AIRFOIL SYSTEM

Maurice E. McKinney, Bellevue, Wash., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 25, 1975, Ser. No. 607,177
Int. Cl.[2] B64C 3/48
U.S. Cl. 244—214 2 Claims



1. A variable camber leading edge airfoil system that is attached to the forward section of the fixed wing section of an aircraft comprising:
- a. a rigid lower panel;
- b. a leading edge beam;

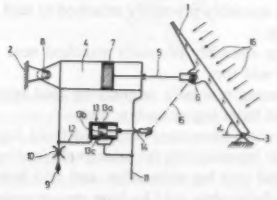
c. a flexible upper panel;
d. an actuating mechanism;
e. at least one lower panel drive element including first, second and third sides a first pivot point near the intersection of said first and second sides, a second pivot point near the intersection of said second and third sides and a third pivot point near the intersection of said third and first sides.
f. said first side of said lower panel drive element being rigidly connected to said rigid lower panel with said third pivot point being adjacent the forward edge of said rigid lower panel and said first pivot point being adjacent the rearward edge of said rigid lower panel, and said lower panel drive element and said rigid lower panel being rotatably mounted to the forward section of said fixed wing section at said first pivot point;
g. the rearward edge of said flexible upper panel being in slidable contact with the upper surface of said forward section of said fixed wing section;
h. and said lower panel drive element and the forward edge of said rigid lower panel being rotatably mounted at said third pivot point to the lower rearward edge of said leading edge beam;
i. the forward edge of said flexible panel being rigidly attached along the upper rearward edge of said leading edge beam;
j. said actuating mechanism including a power element, a drive crank and an elongated drive link;
k. said power element being operably connected to said drive crank and said drive crank being rotatably connected to said lower panel drive element at said second pivot point;
l. one end of said drive link being rotatably connected to said drive crank and the other end rotatably connected to the upper rearward section of said leading edge beam.
m. an upper panel bending beam including at least one bracket;
n. said upper panel bending beam being rigidly connected along the rearward edge of said flexible upper panel;
o. means interconnecting said bracket and said lower panel drive element;
p. counterclockwise rotation of said rigid lower panel and said lower panel drive element results in counter clock rotation of said flexible upper panel and clockwise rotation of said upper panel bending beam with respect to said flexible upper panel thereby causing additional bending of said flexible upper panel.

4,040,580

CONTROL APPARATUS FOR AN AIR BRAKE

Hans-Jüergen Schwäerzler, Taufkirchen, Germany, assignor to Messerschmitt-Boelkow-Blohm GmbH, Munich, Germany

Filed Sept. 12, 1975, Ser. No. 612,634
Claims priority, application Germany, Sept. 17, 1974, 2444310; July 4, 1975, 2529894
Int. Cl.[2] B64C *13/36, 9/32*
U.S. Cl. 244—78 **11 Claims**



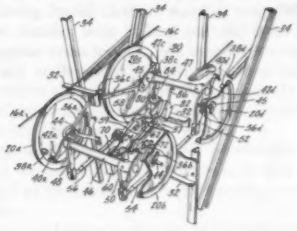
1. A control apparatus for an air brake flap comprising pressure responsive power drive means **(4,7)** including a power drive cylinder piston arrangement, means **(5)** operatively connecting said air brake flap to said power drive means for moving said air brake flap through a range of angular positions, pressure control means **(13)** operatively associated with said power drive means **(4)**, and air brake flap position response means directly and operatively interconnected between said pressure control means **(13)** and said air brake flap whereby said pressure control means **(13)** is continuously and directly responsive to the angular positions (d) of said air brake flap **(1)** to control the pressure in said power drive cylinder as a direct function of said angular positions of the air brake flap in such a manner that the flap at all times assumes the postion determined by the required braking action, whereby the dynamic pressure exerted by the air flow on the air brake flap is continuously in equilibrium with the pressure in said power drive means.

4,040,581

REVERSE THRUST LIMITING SYSTEM

George A. Schlanert, Tustin; Lorin A. Wood, Lakewood, and Gerald A. Rayburn, Garden Grove, all of Calif., assignors to McDonnell Douglas Corporation, Long Beach, Calif.

Filed Feb. 6, 1976, Ser. No. 656,129
Int. Cl.[2] B64C *13/30*
U.S. Cl. 244—83 K **19 Claims**



1. Apparatus for limiting the travel of a cable driven system which includes a drive cable, the apparatus comprising:
a cable drum for frictionally engaging the drive cable;
projecting means attached to the drum for rotation therewith;
variable stop means including a stop lever arm rotatably mounted to engage the projecting means in at least one stop position and an actuator coupled to the stop lever arm for moving the arm into and away from said stop position in response to applied control signals, the variable stop means being selectively positionable for engaging the projecting means to prevent rotation of the cable drum, and thereby movement of the associated drive cable, past a selected position;
support means mounting the cable drum and the stop lever arm for rotation about a common axis; and
coupling means coupling the actuator to the stop lever arm at a point remote from said axis.

4,040,582

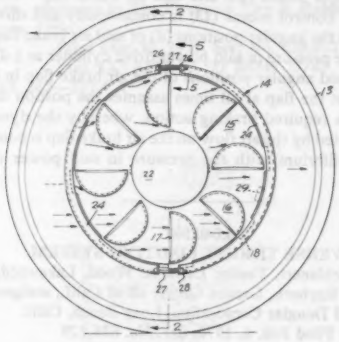
WIND POWER ACCESSORY FOR A VEHICLE WHEEL

Ronald C. Krauss, 515 E. 15th St., Grand Island, Nebr. 68801

Filed Sept. 9, 1975, Ser. No. 611,816
Int. Cl.[2] B64C *25/36*
U.S. Cl. 244—103 S **6 Claims**

1. A wind-utilization attachment for a vehicle wheel of a type having a flanged rim and a pneumatic tire seated on said rim with securing means at the inner portion of the wheel, said attachment comprising a main body engageable in the wheel and having a central aperture through which said wheel securing means are accessible and having peripheral portions engageable with a rim flange, spaced cup members on said main body facing in the same direction of rotation, and clamp means engageable over said peripheral portions and said rim flange for securing said main body to said rim flange, wherein said

peripheral portions of the main body comprise spaced integral lugs engageable on the rim flange, and wherein said clamp means comprises a pair of substantially semi-circular clamping



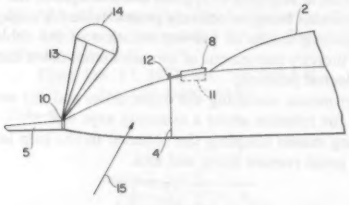
bars engageable on said spaced lugs and having flanges receivable between said rim flange and the adjacent side wall of the pneumatic tire.

4,040,583

METHODS AND APPARATUS FOR EFFECTING RECOVERY OF A HIGH SPEED AIRCRAFT FROM A CONDITION OF INCIPIENT OR DEVELOPED SPIN

William Bihrle, Jr., 284A Tennis Court Road, Cove Neck, N.Y. 11771

Filed Feb. 6, 1976, Ser. No. 656,029
Int. Cl.[2] B64D *17/80*
U.S. Cl. 244—113 14 Claims



1. A method of effecting recovery of a high speed aircraft from a condition of incipient or developed spin, comprising the step of, upon entry into said condition, deploying at least one parachute coupled only to the forebody of the aircraft forward of the center of gravity of the aircraft and being of a size such as to have a negligible influence on the free falling rate of sink of the aircraft while alleviating the spin condition.

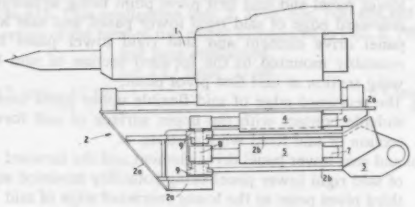
12. In a high speed aircraft, spin recovery apparatus comprising at least one deployable parachute located in the forebody of the aircraft and coupled only to the forebody of the aircraft forward of the center of gravity, the size of said parachute, when deployed for alleviation of a spin condition, being such as to have a negligible influence on the free falling rate of sink of the aircraft.

4,040,584

MOUNTING ARRANGEMENTS FOR MINERAL DISPLACING TOOLS

Arthur David Thompson, Chorley, England, assignor to Dobson Park Industries Limited, Nottingham, England

Filed Feb. 6, 1976, Ser. No. 655,872
Claims priority, application United Kingdom, Feb. 26, 1975, 7948/75
Int. Cl.[2] E21C *11/02*; F16M *13/00*
U.S. Cl. 248—2 13 Claims



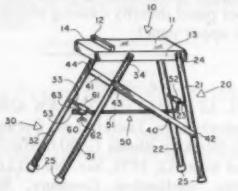
1. A mounting arrangment for a mineral displacing tool comprising a carrier for the tool, pivot means pivotably securing said carrier to a support, a link member attached at one end to said pivot means, and first and second pressure-fluid-operated rams pivotally connected to act between the other end of said link means and said carrier and support respectively, with each ram acting to extend the arc of slewing of the carrier with respect to the support attainable by means of the other ram and about the same pivot axis of said pivot means.

4,040,585

ADJUSTABLE PROJECTOR TABLE

Eduardo L. Socas, 4113 Ortisi Drive, Orlando, Fla. 32807

Filed May 18, 1976, Ser. No. 687,524
Int. Cl.[2] F16M *1/00*
U.S. Cl. 248—11 7 Claims



1. An adjustable table for supporting a slide projector or the like, comprising:

a tiltable table top having a front and rear section;

a rear leg assembly pivotably attached to said rear section of said top;

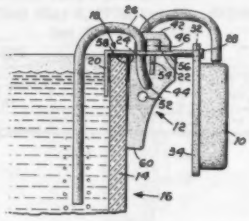
a front leg assembly pivotally attached near said front section of said top;

linking means pivotally connecting said rear leg assembly and said front leg assembly; and

locking means associated with said front leg assembly and said rear leg assembly for selectively locking said top, said front and rear leg assemblies, and said linking means in a fixed relationship, said locking means arranged to permit continuous adjustment of such relationship;

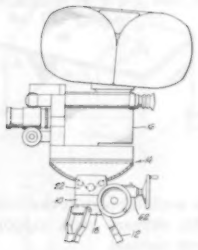
whereby said table top can be continuously adjusted and locked to selected angular positions with respect to said leg assembly and said table can be folded and locked in a folded position for storage.

4,040,586
AQUARIUM BRACKET ASSEMBLY
Robert Newsteder, 349 Irving Ave., South Orange, N.J. 07079
Filed July 12, 1976, Ser. No. 704,360
Int. Cl.[2] F16F 15/00
U.S. Cl. 248—14 10 Claims



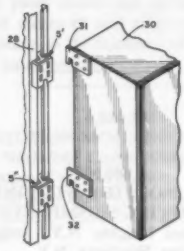
1. A bracket assembly comprising: an upper support angle member having a downwardly extending flange and an outwardly extending platform section, said platform section including a plurality of coplanar openings through the common wall of said platform, and support means projecting from the outer end of said platfrom; a generally vertical member having an upper end engageable with said upper support angle member through one of said openings in said platform section and a downwardly extending lower end, said upper end including an opening there-through positioned adjacent the upper surface of said platform section upon engagement with said upper support member, and a slidable locking member having one end engageable with said vertical member through said opening in said upper end and a downward projection engageable with another of said openings in said upper support member platform section, said locking member securing said vertical member to said upper support member upon said engagement.

4,040,587
CAMERA CRADLE TILT MECHANISM
Robert E. Gottschalk, and Albert K. Saiki, both of Los Angeles, Calif., assignors to Robert E. Gottschalk, Los Angeles, Calif.
Filed May 15, 1975, Ser. No. 577,728
Int. Cl.[2] F16M 11/12
U.S. Cl. 248—185 4 Claims



1. A tilt mechanism for a cradle comprising: a support frame, a cradle, mounting means for mounting said cradle on said support frame such that said cradle may move about a fixed axis in an arc relative to said support frame, said tilt frame having an arcuate surface concentric to said axis, tilt control means for controlling the position of said cradle relative to said support frame, said tilt control means including an elongated toothed strap member of resilient material fixed at each end thereof to said arcuate surface, gear means engaging and partially encompassed by said elongated toothed member, and means for turning said gear means.

4,040,588
BRACKET BASE
William G. Papsco; Harry Cohn, Jr., both of Portola Valley, and Robert E. Bryan, San Jose, all of Calif., assignors to Papsco, Inc., Sunnyvale, Calif.
Filed May 13, 1976, Ser. No. 686,117
Int. Cl.[2] A47G 29/02; B65D 25/24
U.S. Cl. 248—245 4 Claims



1. A bracket base for connecting a shelf bracket to a forwardly opening lipped channel member comprising

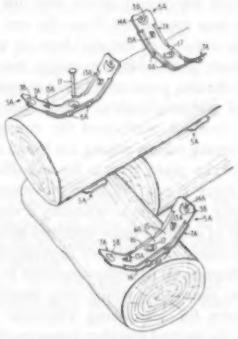
a tubular member with at least one end open and having a rectangular cross section, said member having plane front and back walls and side walls, said front and back walls being wider than said side walls whereby the long dimension of the rectangular open end of the member is parallel to the front and back walls,

said back wall having a central rearwardly inclined T-shaped tongue projecting therefrom at said one end and adapted to be inserted into the opening of said channel member,

said front wall having a plurality of laterally spaced pairs of longitudinally elongated longitudinally spaced slots adapted to receive portions of a bracket to be supported, and

means on the end of said back wall opposite said one end for locking said base to said channel member.

4,040,589
INTERCONNECTING BRACKET FOR LOGS
Roger Berry Cameron McLay, 72 The Serpentine, Bilgola Beach, New South Wales 2107, Australia
Filed Mar. 25, 1976, Ser. No. 670,461
Claims priority, application Australia, Apr. 3, 1975, 1101/75
Int. Cl.[2] A47F 5/00
U.S. Cl. 248—300 14 Claims



1. A bracket for interconnecting adjacent logs in a stack of logs to stabilise stack, comprising a generally flat base for fastening upon a log, four depending projections arranged in pairs, the projections of each of said pairs being substantially

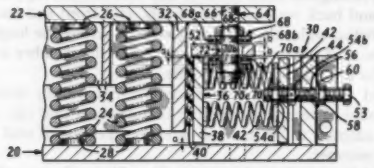
symmetrically disposed about the mid point of the base for gripping of said log in any one of a plurality of relative angular dispositions between said base and said log, a pair of spaced support arms upstanding from opposite parts of the base to accommodate an upper adjacent log therebetween, means for reinforcing said support arms which includes lateral upstanding ribbing extending along said base and part way along said arms, and serrations on said ribbing facilitating gripping of said arms to said adjacent log.

4,040,590

VIBRATION ISOLATOR WITH INTEGRAL NON-AMPLIFYING SEISMIC RESTRAINT

Paul Baratoff, Jackson Heights, N.Y., assignor to Korfund Dynamics Corporation, Westbury, N.Y.

Filed Dec. 15, 1975, Ser. No. 640,582
Int. Cl.[2] F16F *15/04*
U.S. Cl. 248—358 AA **16 Claims**



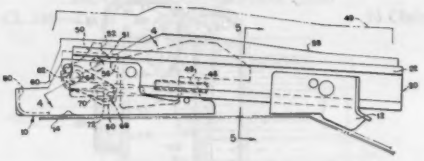
1. In a vibration isolator having a first member, a second member and at least one spring supporting the second member in spaced relation to the first member for vibration isolation of vibratory equipment carried by the second member, the improvement comprising friction restraint means coacting between the members for restraining vibration of the first member relative to the second member in excess of a selected amplitude *a*, the amplitude *b* being greater than the amplitude of vibration in normal operation of the equipment, by a selected and adjusted frictionally developed force F while permitting essentially undamped vibration of any amplitude less than the amplitude *a*, said friction restraint means including at least one friction brake shoe, means interposed between the first and second members for mounting the brake shoe in a rest position between said interposed means and one of the members for essentially free movement from the rest position toward and away from said one of the members up to an amount equal to the amplitude *a* and for preventing movement of the brake shoe from the rest position relative to said one of the members in excess of said amplitude *a*, at least one brake plate affixed to the other member positioned for engagement by the brake shoe, and spring means urging the brake shoe into engagement with the brake plate with a force sufficient to develop the frictional force F upon relative movement of the members in excess of the amplitude *a*, whereby a substantial part equal to the force F of an input force imposed upon one of the members tending to cause such relative movement is transmitted without amplification to the other member by the friction restraint means, and energy-absorbing stop means interposed between the members for restraining vibration of the first member relative to the second member in excess of a selected amplitude *b*, the amplitude *b* being greater than the amplitude *a*, by absorbing energy generated by an input acceleration of one member relative to the other in response to an input force imposed thereon that is in excess of the frictional force F.

4,040,591

POWER SEAT MECHANISM

Joseph Pickles, Birmingham, Mich., assignor to Ferro Manufacturing Corporation, Detroit, Mich.

Filed Aug. 21, 1975, Ser. No. 606,540
Int. Cl.[2] A45D *19/04*; F16M *13/00*
U.S. Cl. 248—394 **2 Claims**



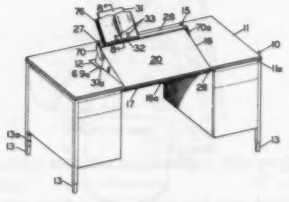
1. An adjustable vehicle seat construction comprising a carriage having slides at opposite sides thereof, a seat construction, lift means intermediate said slides and seat construction, said lift means comprising a pair of bell cranks, pivot means connecting said bell cranks to said slides for rotation about a common axis extending transversely of the vehicle, lift pins carried by said bell cranks remote from said pivot means, depending portions of said seat construction having elongated generally horizontal slots receiving said pins, a torsion tube receiving the inner ends of said pins and adapted to transmit movement from a first one of said pair of bell cranks to the second one, a nut supporting arm fixed to the exterior surface of said tube spaced from the end of said tube and adjacent said first bell crank, a nut pivoted between said arm and said first bell crank, a threaded shaft engaged in said nut, said pins being non-rotatively fixed to said bell cranks and to said torsion tube, the pin connected to said first bell crank extending into said tube beyond said arm and interfitting in reinforcing relation thereto.

4,040,592

DESK TOP WORK SUPPORT DEVICE

Robert E. Jones, 4818 Marathon Drive, Madison, Wis. 53705

Filed Sept. 9, 1976, Ser. No. 721,703
Int. Cl.[2] A47G *1/24*
U.S. Cl. 248—460 **17 Claims**



1. A desk top work support device comprising:

a. an inclinable primary work support member having a primary work surface;

b. a secondary work support member;

c. at least one link arm having a pivoted end and a connected end, the pivoted end being pivotable with respect to the primary work support member and the connected end rotatably engaging the secondary work support member;

d. a positioning shaft mounted on the primary work support member; and

e. rotating means comprising a drive member fixedly mounted on the positioning shaft, a driven member fixedly attached to the secondary work support member, and a drive connector engaged with the drive member and the driven member in connecting relation whereby pivotal

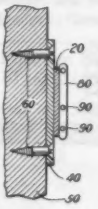
movement of the link arm will cause rotation of the secondary work support member with respect to the link arm.

4,040,593

PICTURE HANGING DEVICE

Kenneth Wiley, Coral Springs, Fla., assignor to The Raymond Lee Organization, Inc., a part interest

Filed May 4, 1976, Ser. No. 683,019
Int. Cl.[2] A47G 1/16
U.S. Cl. 248—489 2 Claims



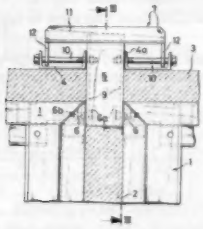
1. A device for hanging flat pictures upon a wall and maintaining the pictures in a level position, comprising:
a first flat plate attached to the wall;
a pedestal attached to the plate and extending outwardly away from it perpendicularly to the wall;
a circular lip located at the outwardmost end of the pedestal, the lip lying in a vertical plane and having a convexly curved outer surface;
a second flat plate attached to the back of a flat picture and located directly above the center of gravity of the picture; and
a flexible circular hollow rim with a convex outer surface and a concave inner surface attached to the second plate, the rim occupying a plane parallel to the plane of the picture and detachably fitting over the lip so as to enable the picture to be secured parallel to the wall while being free to rotate parallel to the wall and thereby reach a level equilibrium position.

4,040,594

ARRANGEMENT FOR CONNECTING AND ALIGNING ADJACENT CASTING FORMS FOR THE CONSTRUCTION OF MULTI-STORY BUILDINGS

Josef Maier, Kreuzbuhlstr. 5, 7611 Steinach, Germany

Filed Mar. 24, 1976, Ser. No. 670,175
Claims priority, application Germany, Mar. 29, 1975, 2514043
Int. Cl.[2] E04G 11/02
U.S. Cl. 249—27 13 Claims



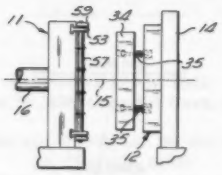
1. An arrangement for casting concrete for the erection of a multi-story building having a ceiling and vertical walls in alignment with each other, comprising casting forms each having vertical panel means and horizontal panel means connected to upper ends of said vertical panel means; at least one intermediate body arranged between adjacent vertical panel means of adjacent casting forms to properly space said adjacent vertical panel means and projecting with an upper portion thereof beyond said horizontal panel means of said adjacent casting forms for a distance greater than the thickness of the ceiling to be cast on said horizontal panel means; connecting means releasably connecting a lower portion of said intermediate body with said adjacent vertical panel means of said adjacent forms; a pair of profiled rails; and carrying means on said projecting portion of said intermediate body carrying said rails spaced from each other a distance corresponding to the thickness of a wall to be cast between said vertical panel means and extending parallel to each other in horizontal direction parallel to said vertical panel means and upwardly spaced from the horizontal panel means of said adjacent casting forms a distance corresponding to the thickness of a ceiling to be cast on said horizontal panel means.

4,040,595

INJECTION MOLDING MACHINE

Charles Tecco, Northfield Center, Ohio, assignor to Weatherchem Corporation, Twinsburg, Ohio

Filed Aug. 9, 1976, Ser. No. 712,589
Int. Cl.[2] B29C 7/00; B29F 1/00
U.S. Cl. 249—68 11 Claims



1. An injection molding machine comprising a stationary mold half, a movable mold half, means for moving said movable mold half along a longitudinal axis relative to said stationary mold half between a molding position adjacent said stationary mold half and an ejecting position spaced from said stationary mold half, said stationary mold half and said movable mold half cooperatively defining a mold cavity when said movable mold half is in said molding position, said mold cavity defining an end closure article having a base and a recloseable tab disposed in an open position relative to said base and connectable friction means on said base and said tab for holding said tab in a closed position relative to said base when said tab is fully closed, means for fully closing said tab and connecting said friction means of said molded plastic article before ejecting said article from one of said stationary and movable mold halves, and means for ejecting said molded plastic article from said one of said mold halves after said full closing of said tab, said means for fully closing said tab including a closing surface and actuator means for moving said closing surface laterally between a retracted position spaced from said mold cavity when said movable mold half is in said molding position and an operating position engaging said tab when said movable mold half is moved away from said molding position by said moving means.

4,040,596

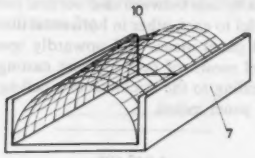
PROTECTIVE DEVICE FOR CASTING MOLDS

Ivo Henych; Erwin Fischer, and Jürg Reist, all of Schaffhausen, Switzerland, assignors to Georg Fischer Aktiengesellschaft, Schaffhausen, Switzerland

Filed May 19, 1976, Ser. No. 688,028
Claims priority, application Switzerland, May 27, 1975, 6735/75
Int. Cl.[2] B22D 7/12
U.S. Cl. 249—117 3 Claims

1. A device for protecting the inner walls of a casting mold, particularly in a mold of the permanent type which is filled by top pouring of molten casting material thereinto, and for im-

proving the surface quality of castings formed in said m... said mold defining a mold cavity including a bottom, said device comprising a metallic member positioned upon said bottom of said mold cavity and located to be directly impinged by molten casting material poured into said mold, said metallic



member being essentially composed of material to effect integration of said metallic member into the casting formed in said mold, said metallic member configured with a bottom plate and a pair of laterally spaced upstanding side walls formed of sheet metal, and a wire lattice arranged above said bottom plate and spaced a distance therefrom.

4,040,597

CORE HOLDING STRUCTURE FOR MOLDS

Fred W. Pierson, Sr., Grand Rapids; Fred W. Pierson, Jr., Wyoming, and Gordon J. Weidenfeller, Grandville, all of Mich., assignors to M&T Mfg. Co., Grand Rapids, Mich.

Filed July 25, 1975, Ser. No. 599,145
Int. Cl.[2] B22C *9/24;* B28B *7/32*
U.S. Cl. 249—134 **6 Claims**

1. A plaster mold structure for molding hollow articles which comprises

a. a one piece plaster mold having an elongated cavity therein,

b. a bushing member permanently locked within said one piece plaster mold having a longitudinal bore contiguous with and in substantial alignment with the longitudinal axis of said elongated cavity,

c. pin means received within said bore of said bushing and extending above the upper surface of said bushing member and partially into said cavity, and

d. a rod-like core member mounted on said pin means of said bushing member with said pin means and a portion of the upper surface of said bushing member providing the sole support for said rod-like core member,

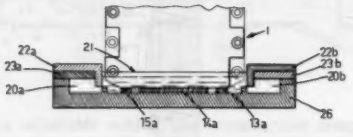
1. said rod-like core member adapted to provide a core for a hollow article molded within said cavity and extending partially out of said mold.

4,040,598

DEVICE FOR THE SEALING OF A BLOCK FORMED OF A PILE OF PLATES, SUCH AS A BLOCK OF A FUEL CELL, WHILE MAINTAINING FREE PASSAGEWAYS BETWEEN THESE PLATES

Jacques Cheron, Versailles, France, assignor to Institut Francais du Petrole, des Carburants et Lubrifiants, France

Division of Ser. No. 88,532, Nov. 12, 1970, abandoned. This application Apr. 16, 1973, Ser. No. 351,645
Claims priority, application France, Nov. 13, 1969, 69.39099
Int. Cl.[2] B29C *5/00, 6/00, 1/12, 1/14*
U.S. Cl. 249—176 **3 Claims**



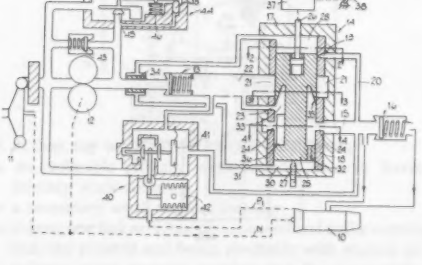
1. A flexible elastic separation comb in combination with a block formed of a pile of spaced plates which is to be sealed by a solidifiable material, said comb comprising a longitudinal base having spaced teeth secured to and extending therefrom, said teeth having a thickness slightly smaller than the width of corresponding spaces between adjacent plates in which respective teeth are inserted, the spacing of the teeth on said base corresponding to the distance between the spaces formed between the plates in which respective teeth are inserted, said teeth having a width less than the width of said plates and a height at least equal to the height of the solidifiable material used to seal the block, wherein the thickness of said teeth and the spacing between adjacent teeth are so selected that small spaces are maintained between each tooth and the facing surfaces of adjacent plates on both sides of each tooth whereby a film of solidifiable material is formed between each tooth and said facing surfaces as said block is sealed.

4,040,599

FLOW CONTROL VALVES FOR LIQUIDS

Trevor Stanley Smith, Sutton Coldfield, England, assignor to Lucas Industries Limited, Birmingham, England

Filed Dec. 9, 1975, Ser. No. 639,042
Claims priority, application United Kingdom, Jan. 17, 1975, 2206/75
Int. Cl.[2] F16K *31/124*
U.S. Cl. 251—28 **14 Claims**



1. A flow control valve for liquids, comprising a body having an axial bore and an inlet port and an outlet port opening into said bore, a control member which is rotatable and axially slidable within said bore to control flow between said inlet and outlet ports, said control member being axially slidable in response to variations in a servo pressure signal, a control orifice opening onto a circumferential face of said bore, and means for rotating said control member, said control member

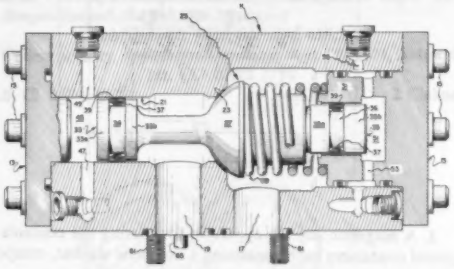
having a generally axially-directed face which includes a portion which co-operates with said control orifice to define a pilot valve for controlling said servo pressure signal, an increase or decrease in said servo pressure signal as a result of rotation of said control member causing the latter to be urged in respective directions which decrease and increase said servo pressure signal.

4,040,600

SHUT-OFF VALVE

Patrick S. Coppola, Schenectady, and Stephen Kotansky, Watervliet, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jan. 15, 1976, Ser. No. 649,427
Int. Cl.[2] F16K *31/122*
U.S. Cl. 251—63 **6 Claims**



1. A fluid actuated, remotely controlled shut-off valve comprising:

a valve housing including an inlet port and an outlet port whereby a controlled fluid is passed through the valve housing;

an axial bore formed within the valve housing, the bore including a valve seat between the inlet port and the outlet port;

a valve member slidable within the axial bore, the valve member being formed with a hemispherical poppet; the valve member having first and second positions whereby in the first position the hemispherical poppet is seated on the valve seat closing the outlet port to the inlet port, and in the second position the hemispherical poppet is unseated for opening the outlet port to the inlet port;

a first spool formed at one end of the valve member in fluid communication with a valve actuating fluid supply;

a second spool formed at the other end of the valve member in fluid communication with a drain; and, wherein each spool comprises:

i. at least two annular lands spaced apart in the axial direction having at least one annular groove formed therebetween;

ii. an "O" ring disposed within each annular groove; and,

iii. slide means comprising an annular channel member disposed about each "O" ring and extending beyond the circumference of said spool in contact with said axial bore.

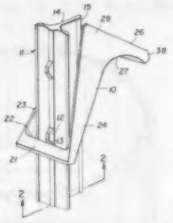
4,040,601

FENCE POST REMOVER

Robert William Boardman, 22742 Yosemite Blvd., Waterford, Calif. 95386

Continuation-in-part of Ser. No. 709,213, July 27, 1976, abandoned. This application Nov. 17, 1976, Ser. No. 742,452
Int. Cl.[2] B66F *3/00*
U.S. Cl. 254—133 R **6 Claims**

1. A device for removing from the ground a metal fence post of the type being substantially T-shaped in horizontal cross-section with uniformly spaced lugs on the face of the T, each said lug defining a predetermined angle to said face; said device having a cross-bar of substantial thickness and an inner face, said cross bar forming an opening in conjunction with two flange members which converge forming an apex having substantial cross-section so as to form a relatively long juncture along the vertical axis, a member of substantial cross-section



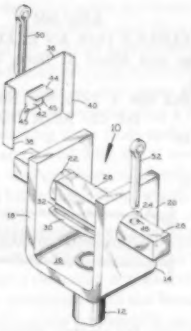
distending downwardly and away from the apex on the side opposite said flanges with the lower terminus thereof forming a substantially flat, concave surface with the lower surface of said flange.

4,040,602

TENSIONING ANCHOR

Howard F. Foster, Sr., 4500 Cavandish Circle, Fort Lauderdale, Fla. 33319

Filed Apr. 1, 1976, Ser. No. 672,754
Int. Cl.[2] A63B *61/04*
U.S. Cl. 254—164 **10 Claims**



1. In a tensioning anchor for tensioning a flexible element such as a wire, strap or cable, said tensioning anchor including a frame with spaced legs having respective openings therein, and a tensioning member extending between said legs and rotatably received in said openings, said tensioning member having generally flat sides, the improvement which comprises:

a sleeve means slidably received on said tensioning member between said legs and having aperture means formed therein for receiving the flexible element that is to be tensioned by wrapping the same around said sleeve means and said tensioning member;

and a locking member having an opening therein with corresponding flat sides for selectively locking said tensioning member against rotation;

said locking member having a pair of opposed, parallel flanges on opposite sides thereof for embracing one leg of said frame;

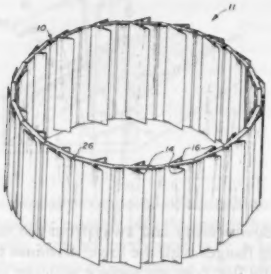
and said locking member having a third flange at said flat sided opening therein for engaging at least one of the corresponding flat sides of said tensioning member;

said flanges serving to lock said tensioning member.

4,040,603
BARBED METAL TAPE

Michael R. Mainiero, Monroe, Conn., assignor to Man Barrier Corporation, Ansonia, Conn.

Filed Apr. 22, 1976, Ser. No. 679,155
Int. Cl.[2] B01F *25/00*
U.S. Cl. 256—8 14 Claims

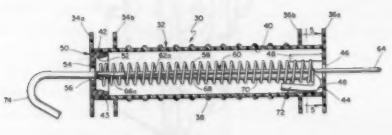


1. A coiled tape formed from substantially planar metal strip stock and comprising a plurality of closed turns of successive linear tape segments each angularly offset in the plane of the tape at a uniform bend angle to its trailing segment at a bend zone between the tape segments, the tape segments each being of substantially equal length and having a bend forming opening between the tape segments in the bend zone of the tape about which opening the tape is edge bent in the plane of the tape to form the angularly offset successive linear tape segments.

4,040,604
GATE HANDLE FOR AN ELECTRIC FENCE

Howard Langlie, and Albert T. Berg, Jr., both of Ellendale, Minn. 56026

Filed Apr. 1, 1976, Ser. No. 672,800
Int. Cl.[2] A01K *3/00*
U.S. Cl. 256—10 6 Claims

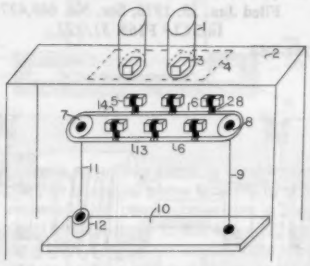


1. A gate handle for electric fences comprising a tubular casing having first and second ends, a compression coil spring contained in said casing having first and second ends, said first spring end residing nearer said first casing end and said second spring end residing nearer said second casing end, a first rod member having a hook at one end engaging said first spring end and having its other end projecting from said second casing end for attachment to one portion of an electric fence, said first rod member having a longitudinal shank extending freely from its hook end through said coil spring and freely through said second casing end to its projecting end, whereby said second casing end is readily movable relative to said first rod member, and a second rod member having a hook at one end engaging said second spring end and having its other end projecting from said first casing end for attachment to another portion of the electric fence, said second rod member having a longitudinal shank extending freely from its hook end through said coil spring and freely through said first casing end to its said projecting end, whereby said first casing end is readily movable relative to said second rod member, said tubular casing having an inwardly projecting portion at its said first end engageable with the hook end of sid first rod member when said casing is moved in the direction of the projecting end of said first rod member to cause said first spring end to move toward said projecting end of said first rod member, movement of said second spring end being resisted by the hook end on said second rod member, whereby said coil spring is compressed.

4,040,605
MAGNETIC STIRRING APPARATUS

Marvin Stanley Towsend, 1365 Potomac Heights Drive, Oxon Hill, Md. 20022

Filed July 14, 1976, Ser. No. 705,113
Int. Cl.[2] B01F *7/00, 13/08*
U.S. Cl. 259—64 13 Claims



1. A magnetic stirring apparatus for stirring the contents of plural containers each containing a magnetic stir bar, comprising:

an energy source for driving the magnetic fluxes of a group of drive magnets;

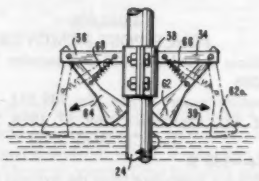
a group of drive magnets, distributed in a first horizontal plane, whose magnetic fluxes are translated repetitively in a predetermined pattern of parallel curves which define a continuous stirring region by said energy source; and

a horizontal support surface of low magnetic permeability, beneath which the magnetic fluxes of said group of drive magnets are repetitively translated in the predetermined pattern of parallel curves and upon which, in said continuous region defined by the predetermined pattern of parallel curves, the containers containing the magnetic stir bars are placed for rotationally agitating the magnetic stir bars in a second horizontal plane by their interaction with the repetitively translated magnetic fluxes of said group of drive magnets, for stirring the contents of the containers.

4,040,606
LIQUID REACTION VESSEL WITH MEANS FOR REMOVING DEPOSITS ON ITS INNER WALLS

Rudolf Mueller, Berlin, Germany, assignor to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

Filed June 20, 1974, Ser. No. 481,240
Claims priority, application Germany, June 21, 1973, 2331993
Int. Cl.[2] B01F *7/16;* B08B *3/00, 9/00*
U.S. Cl. 259—107 9 Claims



1. A reaction vessel for containing a liquid reaction mixture at a predetermined level comprising: a closed chamber; agitat-

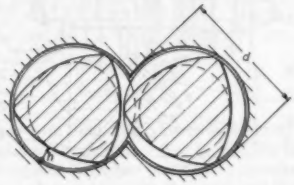
ing means extending into said chamber, including a rotatable shaft for agitating the liquid reaction mixture at a given rotational speed and for rotating at a higher rotational speed upon command; means for rotating said shaft at said given speed and at said higher speed; means for rinsing deposits from the inner surfaces of said chamber above said predetermined level of the liquid reaction mixture, said rinsing means including dispersing means having one end for engaging the surface of said liquid reaction mixture only during such increased rotational speed and for spraying said liquid reaction mixture on the inner surfaces of said chamber, and arm means for connecting said dispersing means to said shaft.

4,040,607

METHOD OF BUILDING UP PRESSURE BY MULTI-SHAFT SCREW EXTRUDERS

Martin Ullrich, Leverkusen, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Sept. 22, 1975, Ser. No. 615,268
Claims priority, application Germany, Sept. 28, 1974, 2446436
Int. Cl.² B29B 1/10
U.S. Cl. 259—192 2 Claims



1. A method of building up pressure within a material comprising using a multi-shaft screw extruder having a plurality of screw shafts arranged to intermesh in pairs and to rotate pairwise in the same sense, in which each screw shaft of a pair has a double thread pressure buildup section corresponding to that of the other screw shaft, wherein the pressure buildup sections have at least in part a ratio of screw pitch t to the internal diameter of the housing d within the range given by the following relationships:

$$\frac{t}{d} > 0.7 \cdot f\left(\frac{h}{d}, \frac{q}{n \cdot d^3}\right);$$

$$\frac{t}{d} < 1.8 \cdot f\left(\frac{h}{d}, \frac{q}{n \cdot d^3}\right)$$

where q is the volumetric throughput of material of a screw pair, n is the speed of rotation of the screw shafts and h is the screw thread depth, and:

$$f\left(\frac{h}{d}, \frac{q}{n \cdot d^3}\right) = \frac{A}{h/d} \cdot \left[a \cdot \left(\frac{q}{n \cdot d^3}\right) - b \cdot \left(\frac{q}{n \cdot d^3}\right)^2 + c \cdot \left(\frac{q}{n \cdot d^3}\right)^3 \right]$$

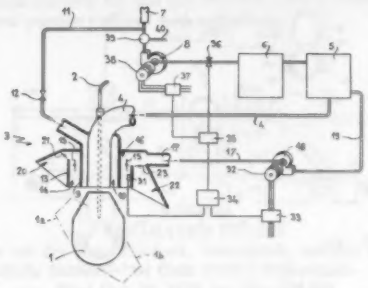
wherein
$A = 0.206$;
$a = 8.8212$;
$b = 18.414$;
and
$c = 31.668$

4,040,608

METHOD FOR THE RECOVERY OF GASES COMING FROM REFINING FURNACES

Jean-François Vicard, Lyon, France

Filed Oct. 24, 1975, Ser. No. 625,724
Claims priority, application France, Oct. 29, 1974, 74.40613; Nov. 29, 1974, 74.40698; Jan. 30, 1975, 75.03510
Int. Cl.² C21B 7/22
U.S. Cl. 266—44 12 Claims



1. In a method for the recovery of gases issuing from a metallurgical refining furnace or converter, in which said gases are drawn off through a hood disposed above the outlet of the furnace and are entered as a gas column into a combustion chamber from which the burnt gases are drawn off by a main blower while air is simultaneously drawn from a space around the furance adjacent to the inlet of said hood by means of an auxiliary blower and is forced into said combustion chamber to burn combustible components of said gases therewithin, the method including the steps of withdrawing a fraction of said combustible gases by sucking them from said gas column substantially before they are mixed with burnt combustion products generated within said combustion chamber to send said withdrawn fraction to utilization means which are external to said combustion chamber.

10. Apparatus for the recovery of gases issuing from a metallurgical refining furnace or converter, of the type having a main hood disposed above the outlet of the furnace, and having a combustion chamber connected with the hood, and having a main blower connected to draw combustible gases through the hood [illegible] chamber, and the apparatus having an auxiliary [illegible] connected to draw air from an auxiliary hood located [illegible] space around the main hood and force it into said combustion chamber to burn said gases therein, the improvement comprising:

a first end wall and a second end wall mutually spaced from each other and closing said combustion chamber;

a gas inlet adjacent to said first end wall and extending into said chamber, said gas inlet being connected with said main hood;

a gas outlet from said chamber adjacent to said second end wall, said gas outlet being connected with said main blower;

an air inlet extending into the chamber and connected to receive air drawn by said auxiliary blower;

a withdrawal pipe in the chamber opposed to said gas inlet and opening directly in front of and substantially coaxially with said inlet;

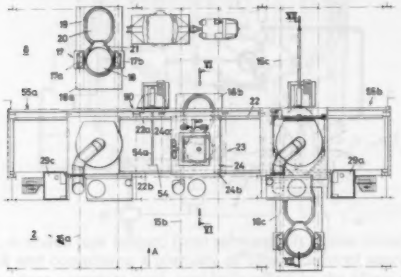
and a third blower connected with said withdrawal pipe and operative to suck combustible gases from said combustion chamber substantially before they have mixed with combustion products generated within said chamber.

4,040,609

METAL SMELTING PLANT WITH TREATMENT STAND TO REGULATE THE ANALYSIS OF METAL SMELTS, PARTICULARLY FOR DESULPHURIZATION OF LIQUID CRUDE IRON OR LIQUID UNREFINED STEEL

Rolf Kullmann, and Erhard Pfeil, both of Duisburg, Germany, assignors to DEMAG Aktiengesellschaft, Duisburg, Germany

Filed Feb. 17, 1976, Ser. No. 658,101
Claims priority, application Germany, Feb. 18, 1975, 2506704
Int. Cl.² C21B *13/14*
U.S. Cl. 266—143 **13 Claims**



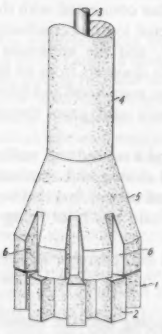
1. A metal smelting plant comprising
a. a charging hall;
b. a smelting furnace hall adjacent said charging hall;
c. a casting hall adjacent said charging hall;
d. a main production line for carrying metal smelts through said smelting furnace hall, and said charging hall to said casting hall; the improvement characterized by
e. an additive treatment area for said smelts adjacent said main production line;
f. at least one branch transportation means connecting said main production line and said additive treatment area; and
g. said additive treatment area including floor mounted treating means and suspended treating means.

4,040,610

APPARATUS FOR REFINING MOLTEN METAL

Andrew Geza Szekely, Yorktown Heights, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Filed Aug. 16, 1976, Ser. No. 714,669
Int. Cl.² C22B *9/00*
U.S. Cl. 266—235 **9 Claims**



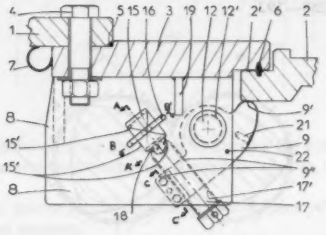
1. A vessel adapted for maintaining metal in a molten state comprising, in combination:
a. an insulating refractory shell having side walls and a bottom wall and being impervious to molten metal.
b. a lining for a major proportion of that interior surface of said side walls and bottom wall, which surface will be below the surface of the melt, said lining comprising graphite or silicon carbide blocks, which blocks (i) are positioned so that said blocks will come in contact with the melt, and (ii) are free to expand in at least two directions in response to the application of heat; and
c. at least one electric resistance heating element disposed within any of the blocks, which comprise the lining for a side wall, said element being non-fixedly attached to, and not in electrical contact with, the block within which it is disposed.

4,040,611

DEVICE FOR CLAMPING THE BASE PLATE OF A STEEL REFINING CONVERTER

Pierre Leroy, 23, rue de Tourville, 78100 Saint-Germain-en-Laye, France, and Emile Sprunck, 5, rue Joffre, 57250 Moyeuvre-Grande, France

Filed Nov. 29, 1976, Ser. No. 745,824
Claims priority, application France, Dec. 5, 1975, 75.37375
Int. Cl.² C21C *5/48*
U.S. Cl. 266—243 **8 Claims**



1. A device for clamping the base plate of a steel refining converter against a plate support ring attached to the casing of the converter, the device comprising:
a plurality of rotatable brackets arranged to be beneath and around the circumference of the plate;
a pair of parallel support flanges in respect of each bracket and attached to the ring;
means for mounting each bracket for rotation on a respective pair of flanges and between an operative clamping position and an inoperative position, said mounting means comprising a metal spindle which extends through the support flanges;
a metal bolt adapted to be engaged in openings formed in a respective pair of flanges and bearing a semi-cylindrical groove,
wherein each said bracket has a first shoulder with a hard surface and arranged to bear against the base plate when the bracket is in its operative position, and a second internally threaded shoulder into which a retaining screw is threaded, the retaining screw being provided with a ball at one end which engages in the groove in the bolt when the bracket is in its operative position.

4,040,612

BLAST PIPE ASSEMBLY FOR THE BOTTOM PLATE OF A CONVERTER OR FURNACE FOR REFINING METALS

Pierre Leroy, 23, rue de Tourville, 78100 Saint-Germain-en-Laye, and Emile Sprunck, 5, rue Joffre, 57250, Moyeuvre-Grande, both of France

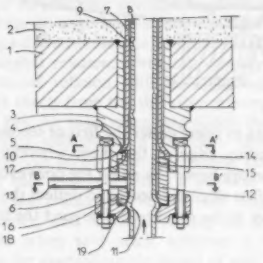
Filed Nov. 30, 1976, Ser. No. 746,153
Claims priority, application France, Dec. 10, 1975, 75.37802
Int. Cl.² C21C *5/48*
U.S. Cl. 266—268 **3 Claims**

1. A blast pipe assembly for mounting on, attachment to and dismounting from the bottom plate means of a convertor or a furnace for refining metals, the plate means including a hollow cylindrical part for surrounding the blast pipe and having at its

lower end portion an inner shoulder and a flange for clamping bolts, the blast pipe assembly comprising;

two concentric pipes for double separate feed, the inner pipe of said concentric pipes being longer than the outer pipe of said concentric pipes and the inner diameter of said outer pipe being greater than the outer diameter of said inner pipe to define a gap between said pipes for admission of fluid, the lower end of said outer pipe, which is arranged to be at the level of said shoulder of said hollow cylindrical part, being flared, said inner pipe having, at a level below the lower end of said outer pipe, a circular swelling;

a hollow cylindrical injector body adapted to be arranged between said flared portion of said outer pipe and said circular swelling on said inner pipe, said injector body having a lateral inlet for fluid for feeding said gap between



said pipes with fluid, at the lower end thereof an inwardly directed machined circular face for bearing in a fluid tight manner against the upper part of said circular swelling on said inner pipe, and towards the upper end thereof a circular round-off for bearing in a fluid tight manner against said flared portion of said outer pipe; and

an annular clamping flange adapted to be arranged beneath said injector body and said swelling on said inner pipe, said clamping flange being adapted to receive the clamping bolts of the hollow cylindrical part and having an inwardly directed machined circular face for fitting against the lower part of said circular swelling on said inner pipe;

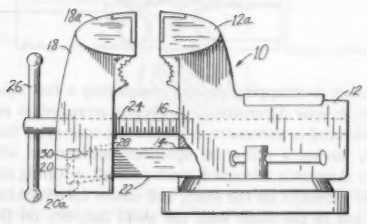
the arrangement being such that the mounting, attachment and dismounting of said assembly as a whole are carried out by simple screwing up or unscrewing of the bolts.

4,040,613

VISE CONSTRUCTION

Raymond H. Kartasuk, Lincolnwood; Walter R. Smierciak, Elgin, and Edward A. Hlinka, Westchester, all of Ill., assignors to Wilton Corporation, Schiller Park, Ill.

Filed Dec. 8, 1975, Ser. No. 638,650
Int. Cl.[2] B25B *1/10*
U.S. Cl. 269—247 **23 Claims**



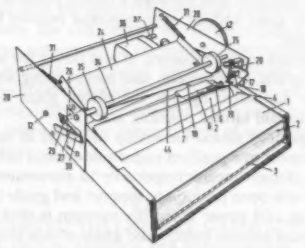
1. A vise construction comprising, a fixed body for mounting to a support surface, a slide passage formed in said fixed body slidably to receive guide bar means, a threaded passage formed in said fixed body to receive a clamping screw, a first jaw means formed on said fixed body, a movable body positioned adjacent said fixed body, a second jaw means formed on said movable body to cooperate with said first jaw means for holding an object, a clamping screw passing through said movable body and threadedly engaging said threaded passage for moving said second jaw means toward and away from said first jaw means, a recess formed in said movable body, slide bar means having one end portion thereof insertable into said recess, said slide bar means extending into said slide passage of said fixed body,, and locking means to secure said slide bar means to said movable body including a mechanical element interposed between said slide bar and said movable body to maintain said one end portion engaged with said recess.

4,040,614

SEPARATOR DEVICE

Lucas van der Does, Oenkerk, Netherlands, assignor to N. V. Optische Industrie "De Oude Delft", Netherlands

Filed Oct. 20, 1975, Ser. No. 623,941
Claims priority, application Netherlands, Oct. 24, 1974, 7413932
Int. Cl.[2] B65H *3/50*
U.S. Cl. 271—19 **5 Claims**



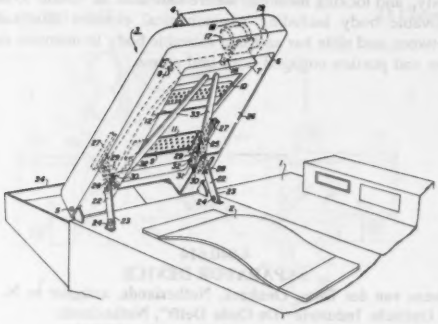
1. A separator device including side walls for singularly moving a rectangular sheet such as a film sheet from a stack of sheets to a transport member, said stack being accommodated in a storage cassette having a rectangular, slotted sheet discharge opening and a hold-down plate for maintaining the uppermost sheet of said stack against a bulge forming means disposed adjacent the discharge opening, said bulge forming means controlled by a first cam disc adapted to perform a reciprocating movement to engage the leading edge of said uppermost sheet of said stack, said uppermost sheet being at least partly released from said stack by forming a bulge at said discharge opening, and wherein there is disposed catching means controlled by a second cam disc proximate to said bulge of said uppermost sheet, said catching means being adapted to lift said leading edge of said uppermost sheet, whereby after release of said uppermost sheet by said catching means said uppermost sheet is caused to lie on a sheet guide means thereby permitting transport rollers to withdraw said uppermost sheet from said stack, characterized in that said bulge forming means and said catching means comprise a pushing element disposed adjacent a corner of said leading edge at said sheet discharge opening and a hook, respectively, and wherein there is provided a third cam disc for imparting a reciprocating movement to said sheet guide means, said guide means having a receding leading edge relative to said storage cassette proximate to said pushing means.

4,040,615

ORIGINAL DISCHARGING DEVICE FOR COPIERS

Takefumi Kurosaki, Isehara, Japan, assignor to Rank Xerox Ltd., London, England

Filed Aug. 16, 1976, Ser. No. 709,143
Claims priority, application Japan, Sept. 21, 1975, 50-109984
Int. Cl.[2] B65H *29/32, 29/48*
U.S. Cl. 271—63 2 Claims



1. An automatic document ejecting device adapted for incorporation in a platen cover of a copying machine having a platen glass for placement of documents to be exposed by the copying machine comprising:

a pivotal cover overlying the platen glass, said cover being pivotable about an axis between a closed position adjacent the platen glass and an open position remote from the platen glass;

vacuum plenum means mounted in said cover for attracting and supporting a document, said means being adapted to press the document against the platen glass when said cover is in said closed position; and,

discharge guiding means moveably mounted in said cover for movement to a position under a document held by said vacuum plenum means responsive to movement of said cover to said open position to support and guide the document from said cover when the vacuum is shut off from said vacuum plenum means, said guide means being moveable to a position alongside the document position responsive to movement of said cover to said closed position.

4,040,616

SHEET TURN AROUND/INVERTER

Stanley G. Clarkson, Penfield, N.Y., and Joseph N. Muscarella, deceased, late of Albrin, N.Y., by Ida M. Muscarella, administratix, assignors to Xerox Corporation, Stamford, Conn.

Filed Jan. 14, 1976, Ser. No. 648,832
Int. Cl.[2] B65H *29/66*
U.S. Cl. 271—65 26 Claims

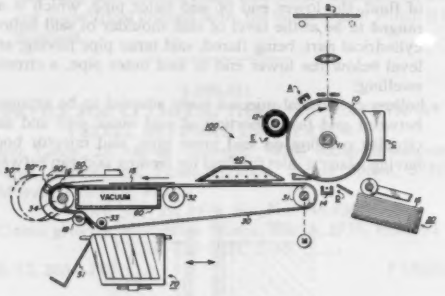
1. A sheet handling apparatus for selectively inverting sheets comprising:

conveying means adapted to convey sheets,

biasing means adjacent to the conveying means adapted to bias sheets against said conveying means, the conveying means conveying the sheets past the biasing means with a leading edge and a trailing edge, said conveying means being shaped so that the leading edge of the sheet separates from the conveyor downstream of the biasing means,

urging means to urge a selected available edge of the sheet back onto the conveyor means after it has been separated from the conveyor means downstream of the biasing means,

movable deflector means to selectively invert the sheet, said deflector means having a first slope and a second slope relative to the leading edge portion of the sheet, said second slope deflecting the leading edge of the sheet away from the conveying means so that the trailing edge of the sheet becomes the available edge to be first urged back to the conveying means, and said first slope deflecting the leading edge of the sheet toward the conveying means to that the leading edge of the sheet becomes the available edge to be first urged back to the conveyor means, and



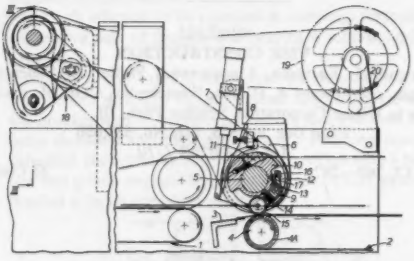
selector means to select either the first or second slope to act on the leading edge of the sheet whereby the sheet is inverted before being placed on the conveyor means only when the first slope is selected to deflect the leading edge of the sheet as the sheet passes beyond the biasing means.

4,040,617

SHEET FEEDING APPARATUS

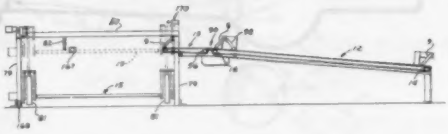
Colin Walkington, Bristol, England, assignor to Masson Scott Thrissell Engineering Limited, Bristol, England

Filed June 14, 1976, Ser. No. 695,565
Claims priority, application United Kingdom, June 17, 1975, 25765/75
Int. Cl.[2] B65H *29/38, 29/66*
U.S. Cl. 271—177 9 Claims



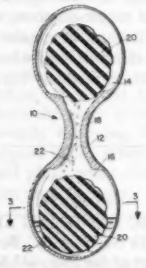
1. A sheet overlapping device comprising a fast upstream conveyor, a slow downstream conveyor arranged to receive sheets delivered in succession from the fast conveyor, the slow conveyor having a roll at its upstream end around which a conveyor element is traversed, a rotary shaft, a rolling element resiliently mounted on the shaft, and means for synchronising the rotation of the shaft with the sheet delivery on the fast conveyor, the shaft being arranged so that the rolling element will nip the trailing portion of each sheet to the upstream roll of the slow conveyor at a point lower than and upstream of the top run of that conveyor and will travel with that sheet, maintaining the nip, over an arc of rotation of the said roll.

4,040,618
SHEET STACKING APPARATUS
Roy E. Vermes, Southwick, and Richard E. Cosby, Feeding Hills, both of Mass., assignors to Revco, Inc., Agawam, Mass.
Filed Apr. 19, 1976, Ser. No. 678,318
Int. Cl.[2] B65H *29/68*
U.S. Cl. 271—182 9 Claims



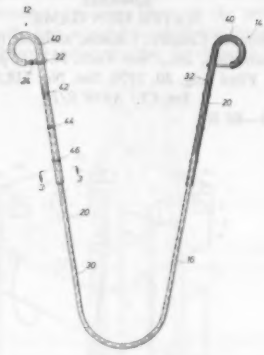
1. Machine for stacking corrugated sheets and the like in superposed edge-to-edge relation comprising a shingling conveyor having a driven endless belt for frictionally carrying said sheets in shingled relation, a transfer conveyor disposed in spaced end-to-end relation with the shingling conveyor for receiving said sheets from the shingling conveyor and including a driven belt for supporting said sheets thereon and frictionally carrying said sheets, a vertically movable platform disposed to receive sheets from the transfer conveyor, means for lowering said platform from a position approximately coplanar with said transfer conveyor as the height of the stack thereon increases, said machine having an automatic stack transfer cycle when said stack achieves a predetermined height, means for controlling the speed of said shingling conveyor and said transfer conveyor and means operable for said stack transfer cycle for stopping movement of said sheets from the shingling conveyor onto the transfer conveyor and including means to arrest movement of said sheets while the belt of said shingling conveyor is moving, said speed control means including means reducing the speed of said shingling conveyor and increasing the speed of said transfer conveyor in relation to the actuation of the said stop means whereby sheets are continuously moved toward said stop means by said shingling conveyor and discharged at increased speed by the transfer conveyor onto said vertically movable platform during said stack transfer cycle.

4,040,619
SQUEEZE TOY AND EXERCISING DEVICE
James V. Landi, 213 Windmill St., N. Providence, R.I. 02904
Filed Aug. 24, 1976, Ser. No. 717,215
Int. Cl.[2] A63B *21/30*
U.S. Cl. 272—68 4 Claims



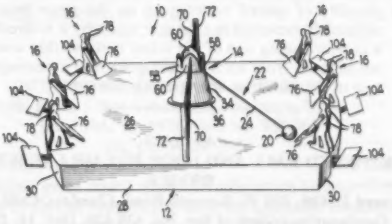
1. An amusement and exercising device comprising:
a flexible and resilient housing means which is manually collapsible for exerting a force on a liquid saturated sponge for forcing the liquid therein from an upper and to a lower portion, said housing means including upper and lower portions, said portions being connected by a constricted neck portion, and
a liquid-saturated sponge loosely held within each of said portions.

4,040,620
RESILIENT EXERCISE DEVICE
Stanton L. Friedman, 2285 Triway, Houston, Tex. 77043
Filed Nov. 17, 1975, Ser. No. 632,391
Int. Cl.[2] A63B *21/02*
U.S. Cl. 272—137 5 Claims



1. An exercise device which incorporates a stretchable resilient member having two ends, each of which is adapted to be grasped in the hands of a user, only one central tubing member telescoped over the stretchable resilient member and extending substantially the full length of the stretchable resilient and which does not extend to the ends of said stretchable resilient member in order to expose the ends thereof, and two end tubular members respectively slidably telescoped over the ends of said central tubing member and which end tubular members are fixed relative to the exposed ends of said stretchable resilient member.

4,040,621
SIMULATED VOLLEYBALL GAME APPARATUS
Gordon A. Barlow, Evanston, and Anson Isaacson, Chicago, both of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.
Filed Jan. 30, 1976, Ser. No. 653,933
Int. Cl.[2] A63F *7/06*
U.S. Cl. 273—85 C 10 Claims



10. A simulated volley ball game apparatus, comprising:
a base structure;
a generally, centrally disposed standard on the base structure;
a ball connected to the top of the standard by a rigid elongated tethering means, said rigid tethering means being mounted to the standard by a universal connection so that the ball may pivot about the top of the standard in any direction;
a plurality of manually actuatable ball impelling means posi-

tioned on the base radially about the standard so as to enable contacting of the ball by timed actuation of the ball impellers to cause the ball to be pivoted about its universal connection across the standard; and

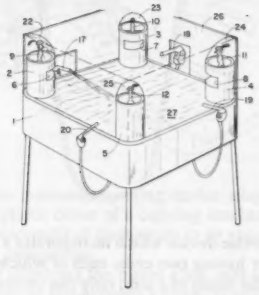
a plurality of detent means on the standard for engagement with the rigid tethering means for limiting and positively directing the ball only toward one of said ball impelling means.

4,040,622

WATER GUN GAME

Vernon J. Sinnott, Calgary, Canada, assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Aug. 30, 1976, Ser. No. 718,863
Int. Cl.[2] A63F *9/14*
U.S. Cl. 273—86 R **3 Claims**



1. A toy game, comprising

a pan-type game board having a plurality of spaced water tanks thereon, each water tank having an opening therethrough for admitting water thereinto, figurine pivotally mounted atop the tank in a manner whereby the figurine is in one of an upright visible position above the tank and a substantially horizontal non-visible position at the top of the tank, float means pivotally mounted in the tank in a manner whereby when water in the tank is beneath a predetermined level, the float means is in upright position and non-buoyant and when water in the tank exceeds the predetermined level, the float means is buoyed by the water to a substantially horizontal position and coupling means for coupling the figurine to the float means whereby when the float means is buoyed to a substantially horizontal position it pivotally moves the figurine to its substantially horizontal position; and

a plurality of spaced water guns on the game board each adjustably mounted in a manner whereby it is directable to a corresponding one of the water tanks so that water may be directed from each of said guns into a corresponding one of the tanks via the opening thereof.

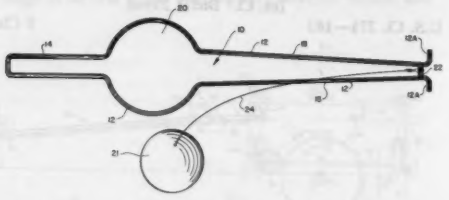
4,040,623

TETHERED BALL AND LOOP TOY OR EXERCISING DEVICE

Howard E. Ott, 280 W. Kenneth Road, Glendale, Calif. 91202

Continuation-in-part of Ser. No. 639,626, Dec. 11, 1975, abandoned. This application Aug. 6, 1976, Ser. No. 712,235
Int. Cl.[2] A63B *67/10*
U.S. Cl. 273—98 **2 Claims**

1. A toy and exercising device comprising: an elongated frame member formed of a continuous wire bent at one end into a U-shaped configuration to define a first pair of sides spaced from one another to form a handle for the device, and said wire further defining a second pair of sides at the other end of the device spaced from one another, and further defining an intermediate loop, the first and second pairs of sides being spaced apart a distance less than the diameter of said loop; a ball; a further wire extending transversely across the frame-like member at the end thereof remote from said handle means; and a flexible line secured to said further wire for tethering said ball to said frame, said line having a length to permit the ball and the frame to be turned relative to one another about the axis of



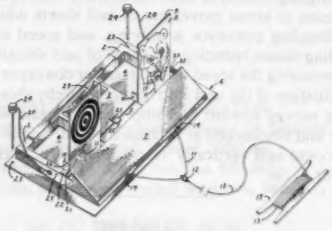
said further wire to permit the ball to pass through the intermediate loop, in which the extremities of the first-named wire at said remote end of the frame are bent outwardly in substantial axial alignment with the further wire to provide secondary handles for the device.

4,040,624

PULL CORD RIGHTING PORTABLE TARGET

Robert Wayne Lee, 3895 W. 2nd Ave., Hialeah, Fla. 33012

Filed Feb. 24, 1976, Ser. No. 660,913
Int. Cl.[2] F41J *7/04*
U.S. Cl. 273—102 AP **17 Claims**



1. A target device comprising a base means, at least two target elements mounted pivotly on said base means and mounted laterally to each other, and a target element resetting means; wherein said target element resetting means comprises a flexible bridling linkage of which one end terminates closely adjacent to one of said target elements, and the other end of said flexible bridling linkage terminates closely adjacent to another of said target elements, and wherein said flexible bridling linkage is maintained medially between said target elements.

4,040,625

FLYING DISC HANDLING APPARATUS

Victor Malafronte, 2910 Newbury St., Berkeley, Calif. 94703

Continuation-in-part of Ser. No. 643,537, Jan. 26, 1976, abandoned. This application Jan. 24, 1977, Ser. No. 761,818
Int. Cl.[2] A63B *67/06*
U.S. Cl. 273—104 **8 Claims**

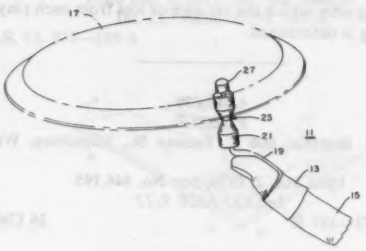
4. A flying disc handling apparatus comprising

a ring member arranged for wearing on the finger of the player;

a shaft secured to said ring member and projecting therefrom to extend from the end of the player's finger; and

a roller journalled on said shaft, said roller having an exter-

nal configuration formed for engaging the inside edge of the rim of the flying disc and to permit the disc to continue



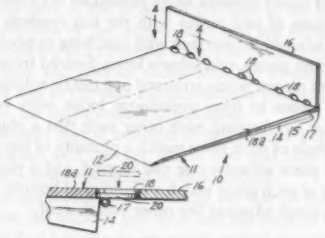
spinning after it has been caught by the player on the apparatus.

4,040,626

BALL AND PUCK GAME

Pasquale Sterlicchi, and Helen Sterlicchi, both of 1-J Kimberton Marrows Road, Newark, Del. 19713

Filed May 7, 1976, Ser. No. 684,303
Int. Cl.[2] A63B *63/04*
U.S. Cl. 273—123 R **1 Claim**



1. A combination ball and puck game, comprising a platform, a back panel which is adjustable and hinged to said platform so as to provide adjustment of the inclination of said panel, the combination having opening means for receiving a ball or puck, support members removably secured to said platform, and removable plug means insertable in said opening means for supporting pucks, wherein said opening means comprise spaced apart openings through said back panel and alignable complementary opening portions through said platform, said openings and opening portions freely receiving ball means for playing said game, and said opening portions complementing said spaced apart openings so that said opening means are circular in configuration when said back panel is pivoted downward to align with the plane of said platform, and said opening means removably receiving, frictionally, said plug means which will support pucks when said panel is aligned with the platform, said plugs being circular and placed in a recessed manner within said openings.

4,040,627

FRICTION TYPE EXERCISING DEVICE WITH IMPROVED FRICTION SETTING MECHANISM

Ronald E. Useldinger, 1150 Wunderlich Drive, San Jose, Calif. 95129

Filed July 22, 1976, Ser. No. 707,895
Int. Cl.[2] A63B *21/00*
U.S. Cl. 272—133 **7 Claims**

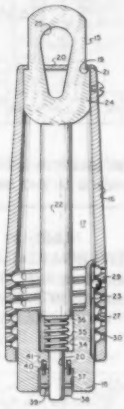
1. An exercising device comprising, in combination:

a body member having an outer wall forming a hollow cavity, said body member having a central axis and axially aligned first and second openings in opposite ends thereof communicating with said cavity;

a hub positioned in said first opening and including an axially extending central opening aligning with said second opening in the body member and including a pair of second openings extending axially and positioned radially outward from the central opening;

a shaft extending through the body member second opening and the hub central opening, said shaft including a hole therein adjacent said body member second opening;

a rope-like member extending through the pair of second openings in the hub, around the shaft and through the hole therein with both ends extending out through the hub; and



means for mounting the hub in the body member and allowing relative rotation thereto, said mounting means including a ball race formed by the hub outer surface and the body member cavity wall with a ball in the race positioned to travel around the body member interior wall as the hub is rotated;

releasable locking means for interlocking the hub and the shaft such that by release of said locking means the hub can be rotated about the shaft to adjust the number of turns of the rope-like member about the shaft;

and means allowing viewing of the position of the ball in the body member thereby to indicate the relative setting of the hub and the body member for determining the approximate frictional force exerted on the rope as it is pulled through the exercise device.

4,040,628

DIETING GAME BOARD APPARATUS

Isaac Louis Pope, 5 Ben Yehuda Str., Netanya, Israel

Filed Feb. 19, 1976, Ser. No. 659,265
Int. Cl.[2] A63F *3/00*
U.S. Cl. 273—134 B **7 Claims**

1. Dieting game board apparatus adapted to be played by a plurality of players operating in turn, the apparatus comprising a combination of:

manually manipulable means bearing indicia for making a chance selection;

a plurality of playing pieces each representing a dieter;

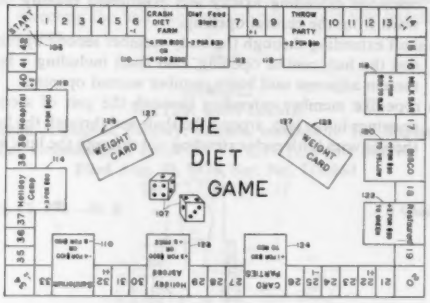
simulated weight indication means corresponding to each playing piece and functioning as a scoring device;

a playing board having a playing surface defined on a base surface thereof;

a series of playing locations defined about the perimeter of said playing surface in substantially contiguous relationship comprising a playing path along which said playing pieces are moved in discrete steps between successive

locations as indicated by said manually manipulable means, said series of playing locations comprising;

a first plurality of locations indicating that a player whose piece lands thereon is to gain weight; and



a second plurality of locations indicating that a player whose piece lands thereon is to lose weight.

4,040,629

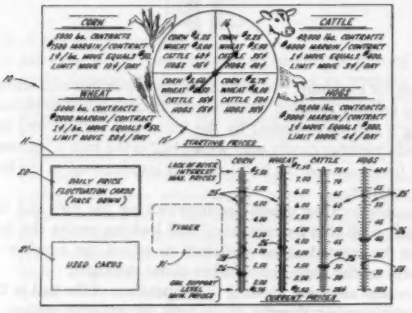
COMMODITIES BOARD GAME APPARATUS

John Kelly, 1020 Glen Flora Ave., Waukegan, Ill. 60085

Filed June 23, 1975, Ser. No. 589,019

Int. Cl.[2] A63F *3/00*

U.S. Cl. 273—135 C **3 Claims**



1. A playing apparatus comprising a playing board delineating a plurality of commodities and the trading terms at which each commodity may be traded by any player during a given playing period,

means for randomly establishing, at the beginning of the game, prices for each of the commodities at which all players may trade the commodities during the first playing period,

a plurality of cards for randomly establishing, at the beginning of each successive playing period, respective incremental price changes for each of the commodities, to give a new set of prices at which all players may trade the commodities during respective successive playing periods, each of said cards having indicia thereon indicating an amount of change in the respective price of each commodity,

an individual scale on said board for each commodity, said scales having divisions to represent incremental price differences between a minimum and maximum values for each commodity,

an individual pointer slideably disposed in said board adjacent each respective scale for individually indicating the current price of each commodity,

means for recording each players purchases and scales of said commodities at the prices in effect during the playing period when the respective purchases and sales were transacted, and

means for regulating the amount of trading during said playing after which the net gain or loss from each players trading is determined.

4,040,630

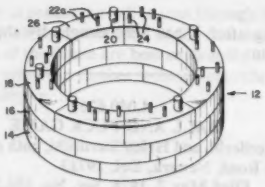
PUZZLE

William G. Brattain, 806 E. Tacoma St., Ellensburg, Wash. 98926

Filed Jan. 2, 1976, Ser. No. 646,195

Int. Cl.[2] A63F *9/12*

U.S. Cl. 273—157 R **16 Claims**



1. A puzzle comprising a plurality of stacked pieces each having a subset of coded symbols taken from a set of said symbols, said coded symbols being present on both the top and bottom surfaces of said pieces with the top symbols of each piece being adapted to interface with matching symbols on the bottom of other pieces, said subsets being derived from said set such that said pieces, when arranged in a puzzle solution, mate with other pieces to form continuous loops with vertically mating pieces overlapping each other such that a plurality of bottom symbols of each piece match a plurality of top symbols of a mating piece adjacent one end thereof, and a plurality of top symbols of each piece match a plurality of bottom symbols of a mating piece adjacent the other end thereof.

4,040,631

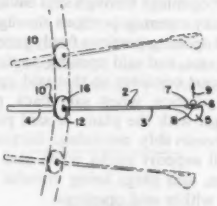
GOLF CLUB SWING GUIDE

Jarvis F. Flippin, 2146 School St., Winston-Salem, N.C. 27105

Filed June 22, 1976, Ser. No. 698,364

Int. Cl.[2] A63B *69/36*

U.S. Cl. 273—186 A **7 Claims**



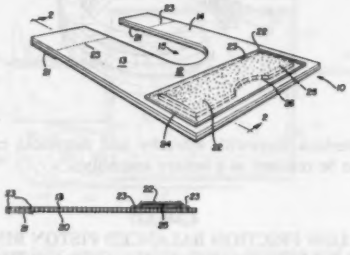
1. A golf club swing indicated comprising a damp connected to the shaft of a golf club, an elongated pin connected to the clamp and extending a substantial distance forward from the clamp and golf club shaft parallel to a line of a lower leading edge of the face of the golf club head attached to the shaft, and a plate connected to the pin adjacent the lower end thereof, said plate defining a plane of substantial area perpendicular to said pin and leading edge so that a golfer in addressing a golf ball may use said plate and pin as an effective reference of the desired swing plane of the shaft and a line perpendicular to the desired direction of ball travel.

4,040,632

SPORTS TRAINING AID

Eddie Pawl, 31246 Gay, Roseville, Mich. 48066

Filed Jan. 2, 1976, Ser. No. 646,017
Int. Cl.[2] A63B *69/36, 69/38*
U.S. Cl. 273—189 A 4 Claims



1. In a removable support training aid for golf or tennis or the like adapted to be worn on the wrist and hand to prevent bending of the wrist in either direction without interfering with the normal gripping action of the hand including a relatively thin generally U-shaped member having a base and opposed spaced apart first and second elongated legs; said base being enlarged in a direction parallel to the elongated axis of said legs to define an enlarged base to fit over the back of the hand, the back of the wrist and the back of the lower portion of the forearm of the wearer; said first leg being wider than said second leg in a direction transverse to the longitudinal axis of the legs; and fastener means attached to the distal end of each leg and to the base for individually fastening each leg to the base; the improvement comprising:

the fastener means attached to said base to define a pocket between said fastener means and said base to receive a removable reinforcing member therein;

so that upon placing the training aid base on the back of the hand, the back of the wrist and the back of the forearm, said first leg may be encircled around the wrist and forearm of the wearer and attached to the base and the second leg extended between the thumb and forefinger and encircled across the palm and around the hand to the back of the hand and attached to the base to thereby rigidly reinforce the wrist of the wearer against bending in either direction without interfering with the normal gripping function of the hand.

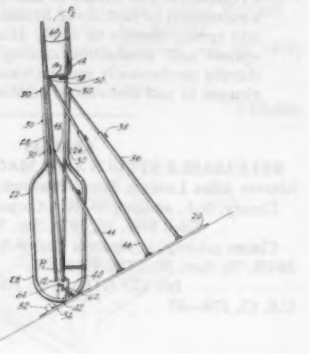
4,040,633

GOLF SWING TRAINING MACHINE

Frank A. Sciarrillo, 9550 Sepulveda Blvd., Sepulveda, Calif. 91343

Filed Feb. 26, 1976, Ser. No. 661,658
Int. Cl.[2] A63B *69/36*
U.S. Cl. 273—191 A 7 Claims

1. A golf practice device comprising a helically shaped guide having at least one and a half turns to provide overlapping portions, means supporting the guide from a horizontal surface with the axis of the helix tilted from the horizontal so as to extend perpendicular to the plane of the normal golf swing, one end of the helical guide terminating adjacent the lowermost part of the helix adjacent the supporting surface and extending from the point of termination in the direction of the backswing to provide spaced overlapping sections of the helical guide in the backswing region of the golf swing.

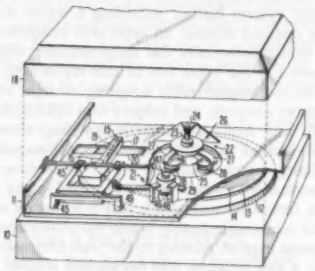


4,040,634

OVERHEAD DISC RECORD GROUNDING APPARATUS

Marvin Allan Leedom, S. Brunswick Township, Middlesex County, N.J., assignor to RCA Corporation, New York, N.Y.

Division of Ser. No. 557,180, March 10, 1975, abandoned. This application Apr. 12, 1976, Ser. No. 676,288
Int. Cl.[2] G11B *1/00*
U.S. Cl. 274—2 4 Claims



1. In a playback system including a base; a turntable rotatably mounted on said base; said turntable having a surface for supporting a disc record; said disc record having a centering hole; a major surface of said disc record having geometrical variations in a spiral groove with information recorded therein; said turntable having a centering hub for concentric alignment of said disc record by engagement of said hub in said centering hole; a pickup arm carrying a signal pickup; said signal pickup during playback subject to a cooperative engagement with said spiral groove for retrieving said information when relative motion is established between said signal pickup and said disc record; said disc record having a conductive coating; a portion of said disc record conductive coating being present in an area surrounding said centering hole; a disc record grounding apparatus comprising:

a. a point of reference potential for said playback system;

b. a cover mounted to said base for motion between an open position and a closed position;

c. a conductive spring element rotatably secured to said cover; wherein when said cover is disposed in said closed position, the axis of rotation of said spring element is substantially collinear with the axis of rotation of said turntable centering hub;

d. means for electrically coupling said spring element to said point of reference potential; and

e. a conductive pad affixed to said spring element such that a movement of said cover to said closed position causes said spring element to firmly press said conductive pad against said conductive coating of said disc record, thereby mechanically and electrically coupling said spring element to said disc record conductive coating.

4,040,635

RELEASABLE STYLUS ARM MAGNETIC COUPLING

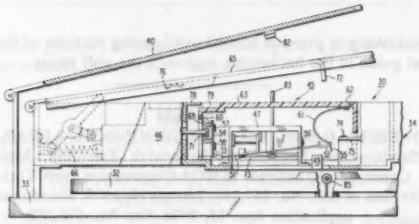
Marvin Allan Leedom, South Brunswick Township, Middlesex County, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Mar. 16, 1976, Ser. No. 667,388

Claims priority, application United Kingdom, Sept. 18, 1975, 38458/75; Nov. 28, 1975, 49109/75

Int. Cl.[2] G11B *3/02*; H01F *7/20*

U.S. Cl. 274—37 **5 Claims**



1. In a system for playing back prerecorded signals from a spirally grooved record; said system including a support element; said system further including a stylus arm carrying a stylus at one end thereof; an apparatus comprising:

A. a first substantially flat magnetizable coupling element secured to the other end of said stylus arm;

B. a second magnetizable coupling element secured to said support element, and subject to a releasable engagement with said first magnetizable coupling element; wherein said second coupling element has magnetizable walls defining a recess; and

C. a permanent magnet mounted in said recess with a separation from said walls such that it forms an annular cavity with said magnetizable walls; the dimensions of said permanent magnet relative to the wall dimensions being such that a gap between said permanent magnet and said first coupling element is established, during said engagement between said coupling elements, which provides a separation between said permanent magnet and said first magnetizable coupling element that is greater than the separation between said permanent magnet and said magnetizable walls.

4,040,636

COMPOSITE PACKING

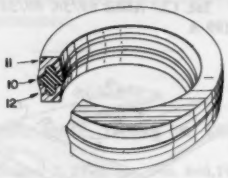
Kenneth Ray Albertson, and Gerald Helmut Beck, both of Salt Lake City, Utah, assignors to Parker-Hannifin Corporation, Cleveland, Ohio

Filed Oct. 4, 1976, Ser. No. 729,252

Int. Cl.[2] F16J *15/24*

U.S. Cl. 277—188 A **13 Claims**

1. A composite packing comprising a first ring of deformable elastomeric material positioned between second and third rings of deformable material but which is less readily deformable than the first ring, said second and third rings each having a recess open to an axial end thereof that faces and is adjacent the first ring, said recesses each forming radially inner and outer lips on the respective second and third rings, each recess having an undercut, said first ring having a central portion and an axial extension at each end of the central portion, each lip having a free end adjacent said central portion, each axial extension fitting within a respective one of said recesses and extending laterally into the undercut thereof to form a mechanical interlock therewith whereby said interlocks cause said rings to be retained as a unitary assembly.



4,040,637

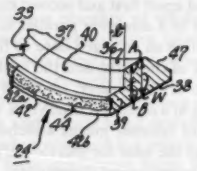
LOW FRICTION BALANCED PISTON RING

Harold E. McCormick, Ballwin, Mo., assignor to Ramsey Corporation, St. Louis, Mo.

Filed Mar. 4, 1976, Ser. No. 663,832

Int. Cl.[2] F16J *9/20*

U.S. Cl. 277—224 **16 Claims**



1. In combination in an internal combustion engine, a piston, a cylindrical bore in which said piston reciprocates and an annular piston ring adapted to be received in a groove in said piston, said piston ring having an upper radial surface, a lower radial surface substantially parallel to the upper radial surface, a first outer axial bearing surface which extends upwardly from the lower radial surface and terminates at an intermediate inwardly extending surface, which intermediate surface terminates at a second outer axial recessed surface and which second outer axial recessed surface terminates at said upper radial surface, an inner axial surface which extends between the upper and lower radial surfaces and against which gas pressure in the groove in said piston acts to urge said piston ring radially outwardly, said second outer axial recessed surface providing a surface against which gas pressure in said bore exerts a radially inwardly directed force to offset at least in part the radially outwardly directed force exerted by the gas pressure acting on said inner axial surface, and which radially inwardly directed force does not appreciably change during the life of the ring, said second outer axial recessed surface having a maximum radius less than the radius of said piston when said ring is in the groove in the piston and in the cylindrical bore of said internal combustion engine.

4,040,638

REFUSE COLLECTING AND CONVEYING VEHICLE

Raymond C. Flagg, P.O. Box 1692, Medford, Oreg. 97501

Filed May 3, 1976, Ser. No. 682,759

Int. Cl.[2] B62B *13/18*

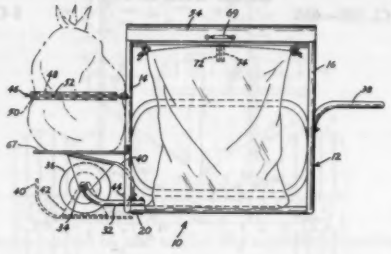
U.S. Cl. 280—9 **7 Claims**

1. A manually operable, ground supported refuse collecting and transporting vehicle comprising, in combination,

a. a rigid bag supporting frame,

b. means for supporting the bag, open end up, within the frame,

c. an unitary, rigid bag cover pivotally mounted on the frame with freedom for movement in its entirety, about a single laterally offset axis, between bag covering and uncovering positions, and



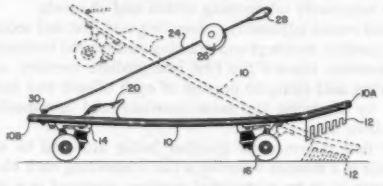
d. horizontally operative bag mouth opening and closing means responsive to operation of the unitary bag cover to spread the bag mouth as an incident of uncovering the bag and to close the bag mouth as an incident of covering the bag.

4,040,639

SKATEBOARD

Anthony Scardenzan, 269 N. Hillcrest Blvd., Inglewood, Calif. 90301

Filed Mar. 25, 1976, Ser. No. 670,361
Int. Cl.² A63C *17/14*
U.S. Cl. 280—87.04 A **2 Claims**



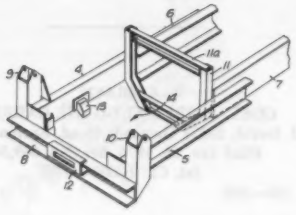
1. A skateboard for carrying an operator in a standing position along a particular path on a supporting surface, the skateboard comprising: an elongated platform for supporting the operator and having a forward end section and an upwardly tilted rear end section; a first wheel truck assembly mounted to the underside of the platform at the forward end section, and a second wheel truck assembly mounted to the underside of the platform forward of the upwardly tilted rear end section; a braking pad secured to the underside of the platform under the upwardly tilted rear end section between the second wheel truck assembly and the rear extremity of the platform in position to engage the supporting surface in a braking relationship when the platform is tilted about the pivot axis of the second wheel truck assembly in a direction to raise the forward end section of the platform; a line tethered to the forward end section of the platform; a spring-loaded reel connected to the line for receiving the line; clip means attached to the line for attaching the line to the operator of the skateboard; and a foot binding mounted on the top side of the platform adjacent to the forward end section thereof and having an open rear end for releasably receiving one foot of the operator on the platform.

4,040,640

VEHICLE CHASSIS

John Robert William Begg, Adlington, near Chorley, England, assignor to British Leyland UK Limited, London, England

Filed Mar. 31, 1976, Ser. No. 672,242
Claims priority, application United Kingdom, Apr. 26, 1975, 17418/75
Int. Cl.² B62D *21/02*
U.S. Cl. 280—106 R **2 Claims**



1. A motor vehicle chassis frame which comprises:

a. a first pair of mutually parallel channel-sectioned members and a plurality of transverse cross-members, means connecting the said first pair to the cross-members to form a first sub-frame, the flanges of the channel-sectioned members facing outwardly away from one another;

b. a second pair of mutually parallel channel-sectioned members and a plurality of transverse cross-members, means connecting the said second pair to the cross-members to form a second sub-frame, the flanges of the channel-sectioned members facing inwardly towards one another;

c. one of the ends of each of the two channel members of the first pair overlapping and abutting one of the ends of each of the two channel members of the second pair on the outside thereof so that the distance between the channel members of the first pair is greater than that between those of the second pair; and

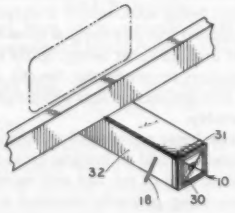
d. means securing the said overlying ends of the said first pair to the said ends of the second pair of channel sectioned members.

4,040,641

TRAILER HITCH COVER

Raymond E. Riecke, Box 404, Ruthven, Iowa 51358

Filed Feb. 6, 1976, Ser. No. 655,737
Int. Cl.² B60D *7/00*
U.S. Cl. 280—507 **3 Claims**



1. Tube hitch protecting apparatus comprising tube insert means for insertion in a tube hitch, said insert means comprising a member, the outer wall of which slidingly engages the inner wall of a tube hitch, first aperture means in said tube insert means for securing said tube insert means to a tube hitch by locking pin means, second aperture means in said tube hitch, said first aperture and said second aperture being alignable for securing said tube insert to a tube hitch by said locking pin means, adjustable extension means comprising threaded shaft

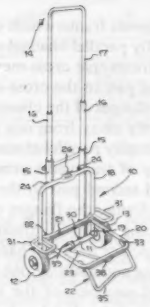
means engaging said tube insert means for moving said extension longitudinally into and out of a tube hitch to align said first and second apertures with one another, opening means in said tube insert for receiving said threaded shaft means, said adjustable extension means being secured to and adjustably projecting outwardly from said insert, tube seal means attached to said extension for sealing the end of a tube hitch when said insert means is positioned in and secured to a tube hitch through said first and second aperture means.

4,040,642

COLLAPSIBLE LUGGAGE CARRIER

Melvin J. David, 16221 Quemada Road, Encino, Calif. 91314

Filed Jan. 15, 1976, Ser. No. 649,341
Int. Cl.[2] B62B *11/00*
U.S. Cl. 280—654 **6 Claims**



1. Luggage carrying apparatus comprising:

a. a telescoping handle assembly comprising a pair of extension members in parallel spaced relation to one another, each extension member comprising a plurality of cylindrical extension segments of uniformly graded diameter is axial alignment with one another, said extension segments of each extension member being concentrically mounted whereby the extension segments of each extension member extend and contract along-a common axis;

b. frictional coupling means for coupling each pair of adjacent extension segments of said extension members;

c. an axle assembly rigidly secured to the termini of said extension members and being perpendicular thereto;

d. a base support being substantially U-shaped and including first and second legs and integral cross-member therebetween, said cross-member being rigidly secured to said extension members perpendicular thereto, said termini of each of said first and second legs being rigidly secured to said axle assembly;

e. a support frame being substantially U-shaped and having first and second legs and an integral cross-member therebetween, said termini of the first and second legs of said support frame being pivotally mounted to the first and second legs respectively of said base support;

f. a brace having first and second legs and a support stand integrally mounted therebetween, the first and second legs of said brace being pivotally mounted between the first and second legs of said support frame in the proximity of the cross-member of said support frame; and

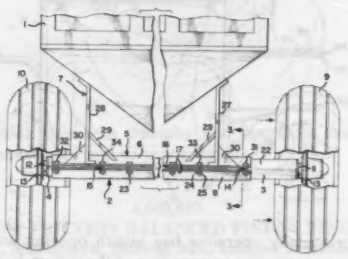
g. retention means for limiting the rotational movement of said support frame with respect to said support base, said retention means coupled intermediate said frame and said axle.

4,040,643

ADJUSTABLE VEHICLE AXLE

Quintin A. Applequist, and Laird V. Hawley, both of Salina, Kans., assignors to Roberts Industries, Inc., Salina, Kans.

Filed Oct. 15, 1975, Ser. No. 622,770
Int. Cl.[2] B62D *63/06*
U.S. Cl. 280—656 **6 Claims**



1. In a load carrying vehicle having a body and wheels, an apparatus for adjustable, lateral spacing of the wheels, including:

a. an axle assembly having elongate, cooperating, first and second intermediate members extending transversely of the vehicle body;

b. said first intermediate member being fixed to the vehicle body, and said first and second intermediate members each having a channel therein, extending transversely of said vehicle body and in facing relation, each channel having first and second planar, diverging surfaces which meet at an apex;

c. first and second end members having portions at one end thereof with wheels rotatably mounted thereon and elongate portions extending between said intermediate members, said elongate portions of said end members each having opposed planar faces and substantially mating with the diverging surfaces of each channel and seating therein at opposing ends of said axle assembly, said elongate portions selectively telescoping within said channels;

d. spaced means adjustably connecting said first and second intermediate members and drawing said second intermediate member toward the first intermediate member, and securing said elongate portion of each of said end members by clamping the same between said intermediate members; and

e. said first intermediate member being attached to said vehicle in a manner whereby a line connecting each channel apex is, in an operational position, disposed in a normally, substantially vertical orientation.

4,040,644

REFUSE BAG CARRIER

Raymond C. Flagg, P.O. Box 1692, Medford, Oreg. 97501

Filed June 17, 1976, Ser. No. 697,134
Int. Cl.[2] B62B *1/12*
U.S. Cl. 280—659 **7 Claims**

1. A carrier device for refuse collecting bags comprising, in combination,

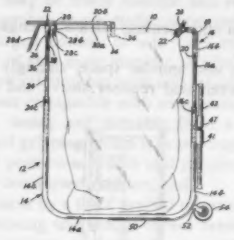
a. an U-shaped frame having a stable base portion and front and rear upstanding arms,

b. first and second bag supporting members carried in telescoping relation by the respective upstanding arms,

c. means for adjustably, individually fixing the bag supporting members at desired levels relative to the upstanding arms according to the length of the bag chosen for use,

d. an extensible coil spring carried by the first bag supporting member, said spring being anchored at one end to the spring carrying member and equipped at the other end with means for effecting detachable connection with a knotted portion of a bag mouth,

e. a slotted member carried by the second bag supporting member adapted for detachable connection with another knotted portion of the bag mouth, and



f. means carried by said second bag supporting member for spreading the bag mouth.

4,040,645

SEAT-BELT APPARATUS

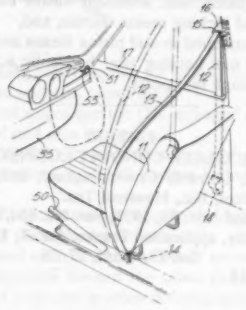
William McAlpin Giffen, Hailey, England; John Michael Pollitt, Gretna, Scotland, and Roy Clifford, Carlisle, England, assignors to Auto Restraint Systems Limited, London, England

Filed June 9, 1975, Ser. No. 585,426

Claims priority, application United Kingdom, June 10, 1974, 25703/74

Int. Cl.[2] B60R *21/10*

U.S. Cl. 280—745 **8 Claims**



1. A seat-belt apparatus of the kind which is arranged to be mounted in a vehicle for automatically moving a seat-belt of the apparatus into, and away from, an operative position across a vehicle seat comprising,

a seat-belt retraction mechanism mounted on a vehicle door adajcent said seat,

means coupling said seat-belt to the retraction mechanism to permit withdrawal of the seat-belt from the retraction mechanism,

said retraction mechanism including acceleration responsive means operable to inhibit withdrawal of the seat-belt from the retraction mechanism when said mechanism is subjected to an acceleration in excess of a predetermined magnitude and to permit such withdrawal at all other times,

and means responsive to the position of said door for permitting said acceleration-responsive means to inhibit withdrawal of the seat-belt only when said door is closed and to prevent such inhibition whenever the door is open.

4,040,646

SAFETY STEERING COLUMN WITH A DEFORMING ELEMENT

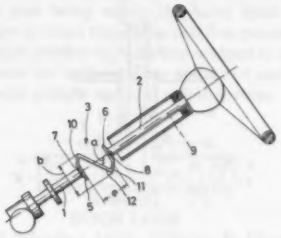
Burckhard Becker, Solingen-Widdert, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Filed Oct. 22, 1975, Ser. No. 624,925

Claims priority, application Germany, Nov. 30, 1974, 2456794

Int. Cl.[2] B62D *1/18*

U.S. Cl. 280—750 **3 Claims**



1. In a safety steering column of the type having a deforming element inserted between a first steering column part connected to a steering gear mechanism for a vehicle and a second steering column part coaxial with the first and mounting a steering wheel for the vehicle, said deforming element connecting the steering column parts in a torsionally rigid manner and being responsive to impact forces occurring in the direction of the steering column axis, the improvement wherein the deforming element is formed from a flat rectangular piece of material which is bent widthwise so as to have a zig-zag longitudinal cross-section generally in the shape of a Z or M, said bends in the element symmetrically defining end legs normal to the steering column axis which are welded to adjoining surfaces of the respective steering column parts, inclined legs continuing obliquely from the end legs, and at least one intermediate leg connecting the inclined legs and intersecting the steering column axis at an acute angle thereto, and wherein the length of the at least one intermediate leg in relation to the other legs of the element, the transverse extension of the element from bend to bend on opposite sides of the steering column axis, and the angle of the at least one intermediate leg to the steering column axis are selected such that the element has both a long deformation path and the property of symmetrical deformation in which the steering column parts move toward each other and remain substantially coaxial upon application of impact forces on the steering column.

4,040,647

MANUAL CONTROLLER FOR VEHICLE LEVEL ADJUSTMENT

Erwin F'Geppert, Novi, Mich., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

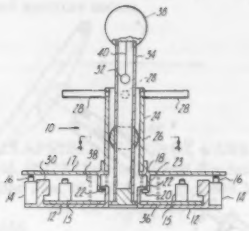
Filed Mar. 19, 1976, Ser. No. 668,351

Int. Cl.[2] B60S *9/14*

U.S. Cl. 280—766 **5 Claims**

1. In a wheeled vehicle having jacks at or near its four corners for temporarily raising and supporting the vehicle in a substantially level attitude irrespective of the slope of the terrain, an improved control mechanism for selectively energizing the jacks: said control mechanism including a vehicle-affixed base structure carrying four perimetrically-spaced switches which individually energize respective ones of the jacks to produce vertical motion of the vehicle in one direction; a rockable platform positioned on the base structure and carrying four other perimetrically-spaced switches which individually energize respective ones of the jacks to produce vertical motion of the vehicle in the other direction; a tiltable switch actuator plate overlying the platform and base structure; first manual means connected to the actuator plate for

tilting said plate downwardly around selected ones of its edges to thereby selectively actuate different ones of the first mentioned switches; means restricting the actuator plate to tilting movements in any of four distinct separate directions that will provide only four possible switch actuations when a tilt force is applied to the first manual means; second manual means connected to the platform for rocking said platform upwardly



around selected ones of its edges to thereby cause the overlying plate to actuate the one of the second mentioned switches that is in an elevated condition; and means restricting the platform to rocking movements in any of four distinct separate directions that will provide only four possible switch actuations when a rocking force is applied to the second manual means.

4,040,648

RECORD SHEETS SENSITIZED WITH REDUCED CHARGE MONTMORILLONITE PIGMENT

Peter A. H. Isaac, Summit, and T. Dixon Oulton, Watchung, both of N.J., assignors to Engelhard Minerals & Chemicals Corporation, Menlo Park, Edison, N.J.

Filed Jan. 12, 1976, Ser. No. 648,253

The portion of the term of this patent subsequent to Nov. 23, 1993, has been disclaimed.

Int. Cl.[2] **B41L** *1/20;* **B32B** *5/16;* **B41M** *3/12*

U.S. Cl. 282—27.5 **15 Claims**

1. A pressure-sensitive record system comprising transfer sheets coated with an encapsulated solution of crystal violet lactone, crystal violet lactone being the sole chromogen in said record system, and image-receiving sheets coated uniformly throughout a recording area thereof with a paper coating adhesive and particles of a reactive pigment obtained by exchanging exchangeable cations in a clay material, a substantial proportion of which is dioctahedral montmorillonite clay, with from about 60 to 120 meq./100 g. of lithium ions, said clay material containing no more than about 7% hydrated silica, heating the clay thus treated at a temperature in the range of 160° C. to 250° C. until the structure of the dioctahedral montmorillonite is collapsed, as evidenced by the fact that the product has a basal planar spacing in the range of about 9.8 to 10.2A., said particles of reactive pigment being essentially all finer than 15 microns and predominantly in the size range of ½ to 5 microns and containing from 0.5 to 4% by weight Li_2O based on the weight of the particles after being heated to constant weight at 1800° F.

4,040,649

OIL WELL TOOL WITH PACKING MEANS

Henry Wayne Blackwell, Venus, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Oct. 31, 1975, Ser. No. 627,633

Int. Cl.[2] **F16L** *37/22;* **E21B** *33/12*

U.S. Cl. 285—3 **5 Claims**

1. A hydraulically actuated releasable connection comprising:

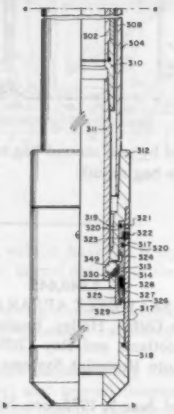
an inner member having locking recess means formed therein;

an outer housing telescoped over said inner member, forming an annular space therebetween, and having ports through the wall thereof;

an intermediate retainer sleeve in said annular space, having openings adjacent said recess means, and being attached to said housing;

locking means in said openings releasably engageable in said recess means;

piston means in said annular space, slidingly and sealably engaged between said retainer sleeve and said housing,



and having abutment means for abutting said locking means into engagement in said recess means;

said piston means being in communication with said port means and further having release channel means formed therein adjacent said abutment means and arranged to receive said locking means therein; and,

latch means attached to said piston means and adapted to be latched to said housing after hydraulic actuation of said piston through said ports.

4,040,650

ARTICULATE CONDUIT CONNECTOR

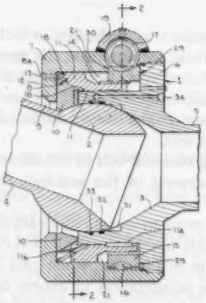
Keith Shotbolt, Gerrards Cross, England, assignor to Comex Marine Services, Inc., Houston, Tex.

Filed Nov. 24, 1975, Ser. No. 634,767

Claims priority, application France, Jan. 7, 1975, 75.01191

Int. Cl.[2] **F16L** *27/06*

U.S. Cl. 285—18 **22 Claims**



1. Apparatus for joining elongated members in an articulated relationship comprising:

a male member, attached to one of said elongated members, having a radially enlarged portion thereon;

a female member, attached to another of said elongated members, into which said male member may be inserted;

gripping means, carried by said female member, movable from a radially expanded position, in which said male member may be freely inserted and removed from said female member, to a radially contracted position gripping said enlarged portion of said male member preventing removal of said male member and locking it in a fixed articulated relationship with said female member;

wedge means engageable with cooperating surfaces of said gripping means and movable from a first position, in which said gripping means is in said expanded position, to a second position in which said gripping means is forced into said contracted position; and

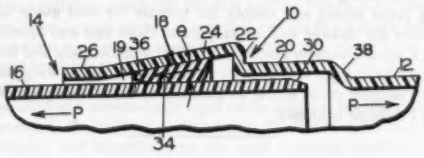
means rotatable by a force applied externally of said apparatus for moving said wedge means between said first and second positions, said rotatable means being self-locking so that upon removal of said externally applied force, said gripping means remains in said contracted, locked position.

4,040,651

SELF-LOCKING PIPE COUPLING

Harvey W. LaBranche, Olympia, Wash., assignor to Western Plastics Corporation, Tacoma, Wash.

Filed Mar. 3, 1976, Ser. No. 663,466
Int. Cl.[2] F16L *17/00*
U.S. Cl. 285—113 **2 Claims**



1. A self-locking pipe coupling for joining the adjacent ends of a pair of pipe sections, comprising

a. a cylindrical spigot portion **(16)** arranged at one end of a first one of said pipe sections;

b. a bell portion **(10)** arranged at one end of a second one of said pipe sections, said bell portion including, in succession,

1. a cylindrical terminal portion **(26)** having a diameter for receiving said spigot portion,
2. a truncated conical portion **(24)** of increasing diameter in the direction toward the other end of said second pipe, said truncated portion defining an angle ϕ relative to the axis of said second pipe,
3. a first radially inwardly directed step **(22)** terminating said truncated portion,
4. a cylindrical inner socket portion **(20)** having a diameter generally equal to the diameter of said terminal portion, and
5. a second step **(38)** terminating said inner socket portion and merging into the remaining portion of said second pipe; and

c. a resilient cylindrical seal **(18)** arranged concentrically within said truncated portion and having an inner diameter for snugly receiving said spigot portion and an outer surface conforming with the inner surface of said truncated bell portion, said seal having a length less than the distance between said cylindrical terminal portion and said first step, said seal having an inner coefficient of friction μ_2 between its inner surface and the outer surface of said spigot, and an outer coefficient of friction μ_1 between its outer surface and the inner surface of said bell truncated portion, where μ_2 is greater than but less than twice μ_1, and where

$$\mu_2 = \frac{\sin\theta + \mu_1 \cos\theta}{\cos\theta - \mu_1 \sin\theta},$$

whereby upon axial insertion of said spigot portion concentrically within said bell portion and said seal, said seal is caused to abut said first step and said spigot portion is caused to abut said second step, so that said seal has a first interference — fit position relative to said spigot portion;

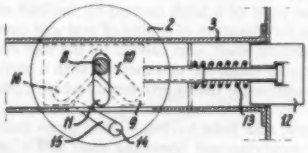
d. said first pipe being axially displaced apart from said second pipe to cause the seal in said first position relative to said spigot portion to be tightly wedged in sealed relation between the inclined inner surface of said bell truncated conical portion and said spigot portion.

4,040,652

DOOR LOCK

Soren Christian Schoubye Arfelt, Ebberup; Ib Christian Clausen, Allested; Johannes Jensen, Odense; Knud Hansen Fynbo, and Jean Arnold Fischer, both of Hjallese, all of Denmark, assignors to Daempa A/S, Knarreborg, Denmark

Continuation of Ser. No. 340,583, March 12, 1973, abandoned. This application Feb. 11, 1974, Ser. No. 441,602
Claims priority, application Denmark, Mar. 20, 1972, 1300/72
Int. Cl.[2] E05C *1/06*
U.S. Cl. 292—167 **2 Claims**



1. A lock for a door or the like, comprising in combination

a tubular casing,

a bolt slidably disposed in said casing along a longitudinal axis thereof,

said bolt being movable between a plurality of positions including a latched position, a locked position and a released position,

actuator means carried by said casing,

an operative connection between said actuator means and said bolt for transmitting movement therebetween in response to movement of the actuator means, said operative connection including a crank element and a connecting rod articulated to said crank element and connected to said bolt by a universal joint, the arrangement being such that in the locked and the released positions,

respectively, of said bolt, the point of articulation between said crank element and said connecting rod is spaced from and located on one and the other side, respectively, of a plane perpendicular to the direction of movement of said bolt and containing the axis of said crank, while in the latched position of said bolt the spacing of said point of articulation from said plane is smaller than such spacing in said locked position,

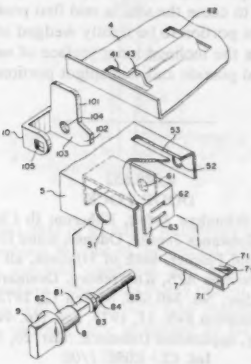
means biasing said bolt toward its latched and locked positions, and

said casing including a first part which contains said actuator means and said crank and a second part which contains said bolt, said first and second parts being rotatable approximately 180° in relation to each other around the longitudinal axis of the casing, whereby the lock may be subject to left and right hand installation.

4,040,653
CONTROL DEVICE FOR STOPPING THE WITHDRAWING OF UNIT CASES

Masaru Takahashi, Nagoya, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed June 17, 1976, Ser. No. 696,920
Claims priority, application Japan, June 19, 1975, 50-83782[U]; June 19, 1975, 50-83781[U]
Int. Cl.² E05C *3/04, 7/06*
U.S. Cl. 292—202 8 Claims



1. In a control device for stopping the withdrawing of a drawer type unit case to a predetermined position by interlocking a main pawl of a latch carried by the unit case, which is slidable in the direction of sliding of said unit case and is fitted on an operating shaft, also carried by the unit case, and rotatable therewith about the axis thereof, with a partition between adjacent unit cases, the improvement which comprises:

a yoke secured to said unit case in the upper frontal area thereof, said yoke having aligned holes therein for rotatably receiving said operating shaft and a latch receiving elongate opening for receiving said main pawl of said latch in one position thereof;

said partition being disposed between adjacent vertically arranged unit cases, adjacent the front end of the cabinet housing said unit cases, said partition having elongate parallel interlocking openings therein arranged parallel to said latch receiving opening of said yoke and a fine groove formed perpendicular thereto and connecting said interlocking openings, so that in a closed position of said unit case, one of said interlocking openings in said partition is aligned with said latch receiving opening of said yoke, whereby said main pawl of said latch locks said unit case in a closed position;

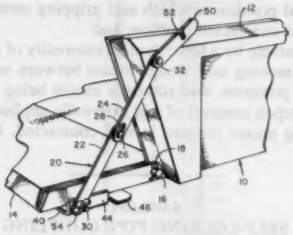
said latch also having a small pawl slidable in said fine groove of said partition, said small pawl facing said fine groove upon turning of said latch to a second position, whereby the unit case may be drawn out in the direction of the operating shaft and the small pawl may be interlocked to the other of said interlocking openings in said drawing step so as to stop said unit case at a predetermined position established by said other of said interlocking openings of said partition.

4,040,654
LINKAGE FOR HINGED TAILGATES

Max Lee Hill, Listie, and Richard James Kimmel, Stoystown, both of Pa., assignors to The Coleman Company Inc., Wichita, Kans.

Filed Feb. 4, 1976, Ser. No. 655,133
Int. Cl.² B62D *33/02*
U.S. Cl. 296—57 R 5 Claims

1. A linkage used in combination with a vehicle body having an end opening and a hinged tailgate for opening and closing said end opening; said linkage comprising an articulated linkage including first and second link arms; a linkage plate attached to said tailgate; a tailgate pivot screw mounted to said linkage plate; a projecting guide tab on said plate extending laterally outwardly of the tailgate, said projecting tab being located between the tailgate pivot screw and the hinged lower edge of the tailgate; folding pivot means connecting together said first and second link arms, at least one of said link arms having a longitudinal slot receiving the folding pivot means, the distal end of said first arm defining a hole through which the tailgate pivot screw extends to form a tailgate pivot point; pivot means fixed on the vehicle body connecting the distal

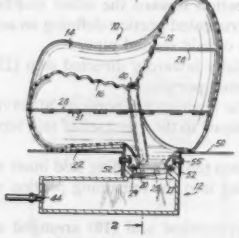


end of said second link arm to said vehicle body whereby said first and second link arms extended in line with the tailgate are held by said articulated linkage in a generally horizonal position in which said vehicle end opening is open, and operative by depressing said articulated linkage downward at said folding pivot means and raising the tailgate for said guide tab to gather the linkage and the tailgate to close said end opening; a lock lever pivotally connected to said vehicle body and having a slot to engage said tailgate pivot screw; and a wing nut on said tailgate pivot screw to lock the lock lever in place when said tailgate is closed.

4,040,655
PNEUMATIC SYSTEMS AND VALVES THEREFOR

Laurence James Garrick, and Rachel Simon, both of 27 Ohayo Mountain Road, Woodstock, N.Y. 12498

Continuation of Ser. No. 351,762, April 16, 1973, abandoned. This application Oct. 28, 1975, Ser. No. 625,925
Claims priority, application United Kingdom, Apr. 17, 1972, 17673/72
Int. Cl.² B60N *1/02*
U.S. Cl. 296—63 10 Claims



1. A pneumatic system designed and adapted for use in a powered vehicle, the system comprising (1) a fluid pump having a high pressure outlet and a low pressure inlet; (2) drive means for the fluid pump, designed and adapted to operatively connect the fluid pump to the vehicle power source; (3) a stabilized, firmly anchored inflatable article, the inflatable article comprising a flexible, substantially fluid-impermeable member, the flexible member being shaped to define a fluid space; marginal portions on the flexible member defining an opening therethrough; and a rigid retaining member in fluid-

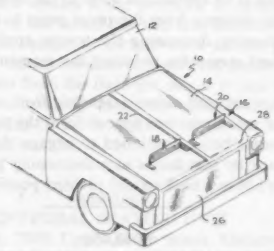
tight connection with the marginal portions, the rigid retaining member and the flexible member defining a fluid-tight space; (4) fluid feed conduit means in fluid flow connection with the fluid pump and with the fluid-tight space; (5) regulating valve means designed and adapted to be positioned in intermediate fluid flow relationship with the fluid pump and the inflatable article, so as to control the flow of fluid between the fluid-tight space, and the fluid pump through the fluid feed conduit means, the regulating valve means comprising (a) a valve housing divided into two mutually sealed off chamber, an inlet chamber being in fluid flow connection with the inlet to the pump, with the atmosphere and with the fluid feed conduit to the inflatable article, a fluid outlet chamber being in fluid flow connection with the outlet from the pump, the atmosphere and the fluid feed conduit to the inflatable article; (b) first valve means capable of closing off the atmosphere from the inlet chamber; (c) second valve means capable of closing off the inlet chamber from the fluid feed conduit; (d) third valve means capable of closing off the outlet chamber from the atmosphere; (e) fourth valve means capable of closing off the outlet chamber from the fluid feed conduit, and (f) integrating means for ordering the action of the first, second, third and fourth valve means to place the pneumatic system is desired sequential operating conditions, whereby in a neutral, or idle, condition, the second and fourth valve means are in the closed position and the first and second valve means are in the open position; in an inflating condition, the first and the fourth valve means are in open positions and the second and the third valve means are in closed positions, permitting the high pressure air from the outlet from the pump to pass to the inflatable article; and in a deflating condition the first and the fourth valve means are in closed positions and the second and the third valve means are in open positions, permitting the pump to draw air from the inflatable article to the low pressure inlet to the pump; the rigid retaining member being designed and adapted to be rigidly connected to a substantially rigid surface on a powered vehicle whereby, in the inflated condition, the flexible member extends outwardly and laterally from the rigid retaining member and portions of the flexible member press against the rigid surface thereby stabilizing the inflatable article with regard to the rigid surface.

4,040,656

BUG DEFLECTOR

Alain Jean-Marie Clenet, 160 Santo Tomas Lane, Montecito, Calif. 93108

Filed June 11, 1975, Ser. No. 585,845
Int. Cl.[2] B60J *1/20*
U.S. Cl. 296—91 **2 Claims**



2. Apparatus for deflecting windshield-blockable material in the atmosphere away from the windshield of a moving vehicle which has a hood in front of the windshield, comprising:

a holder having mount means for mounting on a vehicle hood location in front of the windshield of the vehicle; and

a deflector pivotally mounted on said holder, to pivot between an up position wherein said holder lies above the level of said hood location to deflect air away from the windshield and a down position below said up position;

said deflector comprising an elongated laterally-extending member of constant cross-section with opposite ends, said member including a sheet having a rear edge portion forming the walls of most of a substantially cylindrical hole, a middle portion forming the walls of most of a substantially cylindrical hole on the lower face of the sheet, and a forward edge portion which is bent to extend largely downwardly when the deflector is in its down position; and

said holder includes a pair of hold members located at either end of said deflector member and pivotally connected to said deflector member, at least a first of said hold members having a longitudinally-extending guide slot with a rearward end wall; and including

a Z-rod having a middle portion extending between said first hold member and said deflector member, having a first end portion slideably received in the guide slot of said first hold member, and having a second end portion pivotally received in said hole of said middle deflector member portion; and

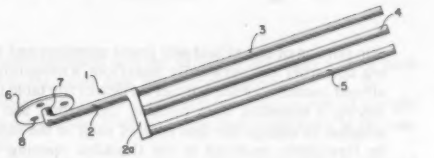
a pair of pins each having one end extending into said hole of said deflector rear edge portion and another end mounted on a different one of said hold members.

4,040,657

VARIABLE-DENSITY VEHICLE GLARE SHIELD

Joyce P. Penzes, Rte. 116, Purdys, N.Y. 10578

Filed June 24, 1976, Ser. No. 699,317
Int. Cl.[2] B60J *3/00*
U.S. Cl. 296—97 R **8 Claims**



1. A variable-density vehicle glare shield, comprising

at least two elongated transparent anti-glare shield elements each having a first and a substantially parallel second longitudinally extending edge portion, said elements each being of a different color and one of said elements having intermediate said edge portions a width which is greater than the width of the other element intermediate said edge portions thereof; and

means connected to one of said edge portions of each element for mounting said elements adjacent an upper edge of a vehicle windshield for movement severally as well as jointly to and from a position in which a user may look through said elements so as to be shielded against glare, said mounting means mounting said elements so that when the same are jointly moved to said position the others of said edge portions are in registry with one another.

4,040,658

FOLDING PICNIC TABLE

George Mayol, 512 State St., Mahomet, Ill. 61853

Filed Aug. 19, 1975, Ser. No. 605,906
Int. Cl.[2] A47C *3/14*
U.S. Cl. 297—159 **1 Claim**

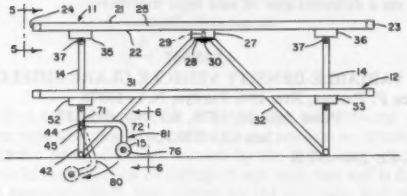
1. A folding pinic table comprising, in combination:

a flat table top, a pair of elongated flat bench-type seats, a pair of side frame members, means pivotably mounting the side frame members to the table top, and means for selectively rolling and stabilizing the table, where the table top is of a flat rectangular configuration having a flat top surface, a flat bottom surface, opposed and edges, and

opposed side edges, and wherein each of the bench seats are identical in configuration and include a flat top surface, a flat bottom surface, opposed flat end edges, and opposed flat side edges: and

each of said side frame members being generally of an inverted T-shaped configuration having their base portion pivotably affixed to the bottom surface of the table top end having their arm portions extending outwardly therefrom to engage the ground surface, and further characterized by a series of vertical members projecting upwardly from the arm portions and adapted to supportingly receive the bench seats thereon with the picnic table in the open position, said vertical members being further characterized by holes therein extending parallel to said arm portions, the holes in adjacent vertical members being aligned in pairs, and wherein further the means pivotably affixing each of said side frame members to said table top being comprised of a pair of mounting blocks each affixed to the bottom surface of said table top and extending transversly thereacross adjacent opposite end edges thereof, and a pivot pin hingedly connecting the base portin of said side frame member to the surface of said block; and

a pair of strut members each having one end affixed to the



arm portion of one of said side frame members and extending upwardly and outwardly therefrom, a mounting block affixed centrally of the bottom surface of the table top and having a threaded bore opening therefrom, and a bolt adapted to engage the free ends of each of the struts and be threadably received in the threaded opening of said mounting block to removably secure the struts thereto; and

said means for selectively rolling and stabilizing the table including a pair of wheels, a pair of L-shaped supporting arms, each wheel having an L-shaped supporting arm associated therewith with the wheel being rotatively mounted to one end thereof, the end of each said L-shaped supporting arm opposite said wheel mounted thereon having a hole extending therethrough parallel to the axis of said wheel and being aligned with a pair of said holes in adjacent vertical members of said side frame members, and pin means removably positioned in said aligned holes of adjacent vertical members and in the hole in each said L-shaped supporting arm to adapt said L-shaped supporting arms for rotatable movement about said pin means and allow said wheels to be selectively positioned between an inoperative storage position and an operative position wherein said table is adapted to be rolled on said wheels.

4,040,659

FOOD TRAY FOR AUTOMOBILES

Addie M. Arnold, Box 2603, Kansas City, Mo. 64142

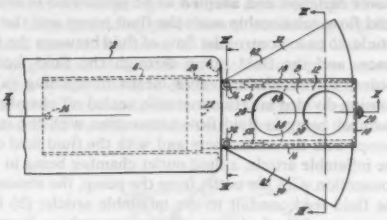
Filed June 1, 1976, Ser. No. 691,233
Int. Cl.[2] A47C *7/62*
U.S. Cl. 297—194 **3 Claims**

1. A food tray for automobiles comprising:

a. a hollow, elongated tubular arm,

b. mounting means operable to support said arm for longitudinal sliding movement horizontally in the arm rest of an automobile, whereby said arm may be extended forwardly from the forward end of said arm rest, and

c. a pair of tray leaves normally enclosed in said hollow arm, said leaves being substantially horizontal, each having a transverse width substantially equal to the transverse width of said arm, and being disposed in over-and-under



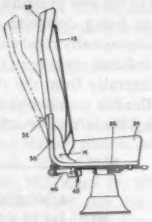
relation when enclosed in said arm, each of said tray leaves being pivotally mounted within said hollow arm on a vertical axis, whereby to be laterally extensible from said arm in a horizontal direction.

4,040,660

ADJUSTABLE BACK SEAT WITH REDUCED MOMENT ARM

Chester J. Barecki, Grand Rapids, Mich., assignor to American Seating Company, Grand Rapids, Mich.

Continuation-in-part of Ser. No. 602,882, Aug. 7, 1975, abandoned. This application Sept. 14, 1976, Ser. No. 723,202
Int. Cl.[2] A62B *35/00*
U.S. Cl. 297—389 **23 Claims**



1. A vehicle seat having a movable back and a seat frame, said seat back being pivotally mounted about a pivot point comprising:

means for reducing the moment arm of a force applied to the seat back at an application point so the moment arm is less than the distance from the pivot point to the application point thereby decreasing the torque applied to the seat back, said means for reducing the moment arm comprising:

a back support stop means extending from one of said seat back or seat frame and spaced from the pivot point, said stop means being positioned to engage the other of said seat back or seat frame at a restraining point when the back is not in a backwardly pivoted position.

4,040,661

VEHICLE SEAT WITH HEADREST MOVEMENT RESPONSIVE TO SEAT BACK TILTING

Gerard T. Hogan, Southington, and Kirby B. Weik, Litchfield, both of Conn., assignors to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 520,311, Nov. 4, 1974, Pat. No. 3,929,374. This application Dec. 19, 1975, Ser. No. 642,520
Int. Cl.[2] A47C *3/00*
U.S. Cl. 297—284 **3 Claims**

1. In a vehicle passenger seat having a seat section, seat support framing and a reclining seat back, the improved con-

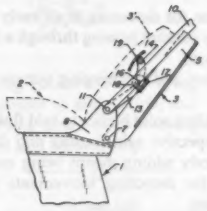
struction to provide a movable headrest section, which comprises in combination,

a. an elongated tilting seat back section having a hinged connection at its lower end to a fixed location on non-moving seat support framing,

b. a relatively short tilting headrest section having a hinged connection from its lower portion to the rearward part of the upper end portion of said seat back section and forming an extended portion for the latter,

c. a fixed length, linking member connecting to a fixed position, non-translating, lower pivot means on the non-moving seat support framing at a position spaced upwardly from said hinged connection for said back section, and said linking member extending upwardly to an upper pivot means on said headrest section which is spaced from and positioned forward of the hinged connection between the upper part of said seat back section and said headrest section,

d. said linking member positioned to be generally parallel to the tilting seat back section, such that as the latter is tilted from a generally upright position to a recline position there is a resulting translation of the top end portion of the



seat back section relative to said upper pivot point means between said linking member and said headrest section and a resulting forward tilting of the latter section with respect to the back section, and

e. a transverse lumbar support bar extending across the lower portion of said tilting seat back section in the zone of the lumbar region of a seat occupant, said support bar having fixedly connected arm members which extend downwardly to pivotally connect with the seat support framing to thereby provide for an arcuate movement of the lumbar support bar about the connection points to the framing, longitudinal slot means being provided in the midportions of each of the arm members from the lumbar support bar, and fixed pin means from each side portion of said seat back section being provided to extend through the respective slot means for said arm members whereby the tilting movement of the seat back section provides a relative movement between the seat back framing and said arm members from the fixed pin means in said slot means and there is a resulting translation of the connecting lumbar support bar to move with respect to the framing for the seat back section.

4,040,662

INTEGRAL SEATING UNIT

John A. Speidel, 7955 Upper River Road, Maineville, Ohio 45039

Filed Apr. 30, 1973, Ser. No. 355,656

The portion of the term of this patent subsequent to July 17, 1990, has been disclaimed.

Int. Cl.[2] A47C *5/12*

U.S. Cl. 297—445 **6 Claims**

1. A seating unit integrally formed from a single sheet of material comprising,

a. a seat section and support section joined by connecting sections,

b. the entire support seat and connecting sections being developable to a unitary flat pattern,

c. said support, seat, and connecting sections being ruled surfaces in which rule lines thereof meet upon the contour of the unit, the images of said rule lines when projected on the pattern meeting on the pattern,

d. rule lines of the contours and the images thereof when projected on the pattern meeting at other than a straight line extending from edge to edge of the contour and pattern, respectively, and

e. the seating unit thus formed being self-sustaining and load-carrying.

4,040,663

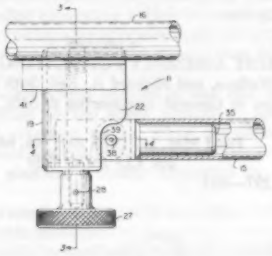
SEAT BACK TILT CONTROL UNIT

Fredrich M. Christensen, 10256 Prairie Road, Omaha, Nebr. 68134

Filed Nov. 16, 1976, Ser. No. 742,254

Int. Cl.[2] A47C *1/024*

U.S. Cl. 297—361 **6 Claims**



1. A self-contained unit for adjusting the tilt of a chair back relative to the chair seat, the unit comprising

a. a housing having top and bottom walls, a pair of upright side walls and a front end wall, and being open at the rear end;

b. bracket means on the outside of one side wall and adapted to be connected to a chair seat;

c. a vertical shaft supported for rotation and held captive against axial movement by the top and bottom walls, the shaft having a threaded central section within the housing and a plain end section which extends to the exterior of the housing through the bottom wall;

d. an actuating knob fixed to the plain shaft section outside the housing;

e. a pivot member threaded onto the central shaft section and being free to move vertically within the housing as the shaft is turned; and

f. an adjusting member having a portion outside the housing adapted to be connected to a tilting chair back and being joined to the pivot member by a pivotal connection located adjacent the rear end of the housing,

g. the pivotal connection between the pivot and adjusting members including a pivot pin which is normal to the axis of the shaft, is pressed into one of those members and has a close sliding fit in a slot formed in the other of said members.

4,040,664

HARNESS ANCHORING FOR CHILD SAFETY SEAT

Akira Tanaka, Northridge, and Charles J. Ulrich, Montecito, both of Calif., assignors to American Safety Equipment Corporation, Encino, Calif.

Continuation of Ser. No. 608,657, Aug. 28, 1975. This application Nov. 9, 1976, Ser. No. 740,308

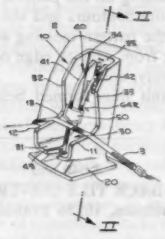
Int. Cl.[2] A62B *35/00*

U.S. Cl. 297—389 **10 Claims**

1. In a child safety seat having front and rear sides and a

harness for maintaining a child against the front side, the improvement comprising the provision of:

slot means for passage of part of said harness from the front side to the rear side of the seat; and anchoring means



secured only to said seat on its rear side for providing a plurality of selectable independent anchoring locations on the seat for anchoring said part of the harness at selected vertical independent anchoring locations on the rear side of the seat.

4,040,665

ARM REST ASSEMBLY FOR SEATING STRUCTURES

Earl C. Wallace, and Richard A. Bell, both of Andrews, Ind., assignors to General Engineering & Mfg. Corporation, Andrews, Ind.

Filed Mar. 12, 1976, Ser. No. 666,181
Int. Cl.[2] A47C 7/54
U.S. Cl. 297—417 **5 Claims**

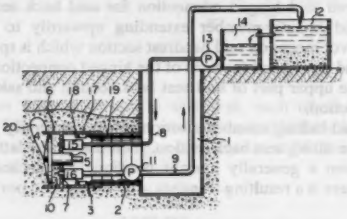
1. An arm rest assembly for a seating structure having a seat and a back secured to said seat comprising a rigid, elongate arm rest element having an arm supporting surface and adapted to be supported on said back to extend said arm supporting surface generally normal to said back; a first pivotal element mounted on said arm rest element; a second pivotal element mounted on said back and adapted to cooperate with said first pivotal element in establishing an arc of motion of said arm rest element in planes generally normal to the general plane of said back and extending between a first position in which said arm supporting surface is generally parallel to said seat back and intermediate said second pivotal element and said seat and a second position in which said arm supporting surface subtends an acute angle with said back; detenting means on said first and second pivotal elements cooperating to latch said arm rest element against pivotal motion at a third position in the arc of its motion intermediate said first and second positions; said first and second pivotal elements being a cylinder and a journal for said cylinder; said detent means including a first abutment mounted on said cylinder and an abutment on said journal and selectively engageable with said first abutment; and biasing means tending to displace said cylinder and said journal relatively axially to engage said first and second abutments; wherein said cyclinder is hollow and said journal includes a cup adapted to receive the end of said cylinder, wherein said abutment on said cylinder is a bar extending diametrically across a section of said cylinder, and wherein said biasing means is a coiled compression spring fitted within said cylinder with adjacent turns thereof gripping said bar and with an end thereof extending beyond said cylinder for compressive engagement with the interior of said cup.

4,040,666

APPARATUS AND METHOD OF SHIELD EXCAVATION

Yoshiaki Uchida, Ichikawa, and Kazuhiko Ishiwata, Tokyo, both of Japan, assignors to Tekken Kensetu Co. Ltd., Tokyo, Japan

Filed May 17, 1976, Ser. No. 687,200
Claims priority, application Japan, Oct. 13, 1975, 50-122534
Int. Cl.[2] E21D 9/04, 9/12
U.S. Cl. 299—1 **6 Claims**



1. An apparatus for detecting at an early stage any fluctuation in solid body amount passing through a fluid path comprising in combination,

a feeding system and discharging system forming said fluid path,

a means for adding solid bodies to said fluid path at a position between respective said feeding and discharging system, said solid body adding means being movable and including means for detecting movements of the solid body adding means,

a first measuring means for measuring flowing amount of a fluid passing through said feeding system at a position in close proximity to said solid body adding means,

a second measuring means for measuring flowing amount of a fluid containing said solid bodies added and passing through said discharging system at position in close proximity to the solid body adding means,

a means for detecting an amount of said solid bodies added by the adding means, said detecting means being connected with said first and second flow measuring means for comparing measured values of respective flowing amounts of both of said systems, and

a means for determining any difference between detected values of both detecting means so as to make the added solid body amount substantially constant by adjusting the movement of the solid body adding means in response to output value of said determining means.

4,040,667

APPARATUS FOR RECOVERING PARTICULATE MATERIAL FROM THE SEA BOTTOM

Hans Tax, Munich, and Herbert Kurz, Putzbruan, both of Germany, assignors to Hans Tax, Munich, Germany

Filed Aug. 13, 1975, Ser. No. 604,151
Claims priority, application Germany, Aug. 16, 1974, 2439485
Int. Cl.[2] E02F 5/00, 9/06
U.S. Cl. 299—8 **17 Claims**

1. Apparatus for recovering manganese nodules from the bottom of the sea comprising:

a. a transfer station;

b. suspending means for suspending said station from a surface ship at a fixed depth;

c. a winch on said station;

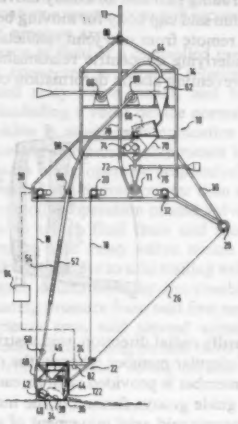
d. a flexible tension member depending from said winch;

e. a dredging tool assembly suspended by said tension member from said station;

f. sensing means on said assembly for sensing the spacing of said assembly from said bottom of the sea;

g. control means operatively connected to said sensing

means and to said winch and responsive to the sensed spacing for operating said winch and for thereby varying the effective length of said tension member between said winch and said assembly;



h. first conveying means for conveying dredged material from said assembly to said station; and

i. second conveying means for conveying said material from said station to said surface ship.

4,040,668

GROOVE CUTTING APPARATUS

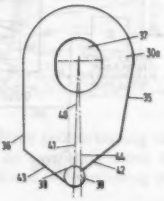
Ernest Sidney Fairweather, London, and Philip Jackson, Barlborough, near Chesterfield, both of England, assignors to Errut Products Limited, London, England

Filed Dec. 23, 1975, Ser. No. 643,937

Claims priority, application United Kingdom, June 30, 1975, 27523/75

Int. Cl.² E01C *23/09*

U.S. Cl. 299—39 **8 Claims**



1. Groove-cutting apparatus comprising a carriage carrying a rotatable cutting drum, and drive means for rotating the cutting drum, the cutting drum comprising a central shaft, a plurality of spaced drum segments coaxially mounted on the central shaft, a plurality of second shafts spaced circumferentially around the central shaft and supported by the drum segments, and apertured cutting members mounted on the secondary shafts and spaced by the drum segments, each of the cutting members including an elongated plate, and a cutting tip insert mounted in a recess at one end of the plate, each of the plates having an elongated aperture axially aligned with the respective cutting tip and arranged so that the center of gravity of the cutting member is between the respective aperture and cutting tip, and each of the plates having a leading edge and a trailing edge which tapers towards the respective cutting tip, the taper of the leading edge being steeper than the taper of the respective trailing edge.

4,040,669

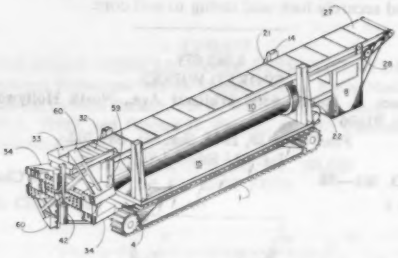
SELF PROPELLED EXCAVATING VEHICLE

Wesley D. Franklin, 1005 D. Pleasant Oaks Road, Baltimore, Md. 21234

Filed Dec. 11, 1975, Ser. No. 639,737

Int. Cl.² E21D *9/10*

U.S. Cl. 299—56 **9 Claims**



1. A self propelled excavating vehicle comprising:

a. a base frame having a tractive means, the lower portion of said tractive means connected to said base frame by a hinge means;

b. extension means fixedly secured to said base frame and hingedly affixed to the upper portion of the tractive means, said extension means, when activated, causing rotation of said tractive means about said hinge means;

c. a movable platform pivotally supported by said base frame;

d. means for pivotally rotating said base frame with respect to said movable platform;

e. bearing assembly means fixedly mounted on said movable platform;

f. a rotatable shaft carried by said bearing assembly means and supporting a drill head assembly at one end thereof;

g. first conveyor belt means supported by said drill head assembly;

h. second conveyor belt means secured to said bearing assembly means for cooperating action with said first conveyor means; and

i. an operator's cab and operating control means attached to the most rearward of said bearing assembly means whereby said cab maintains the same vertical attitude as said most rearward bearing assembly means while operating said vehicle.

4,040,670

METHOD OF MOLDING A SKATE WHEEL HAVING A POLYESTER CORE AND A POLYURETHANE CASE AND THE PRODUCT THEREOF

Maurice Charles Williams, Anaheim, Calif., assignor to Perma Rain Irrigation, Inc., Lindsay, Calif.

Continuation-in-part of Ser. No. 566,792, April 10, 1975, abandoned. This application Jan. 21, 1976, Ser. No. 651,186

Int. Cl.² B29C *6/00, 27/00*; B29D *9/00*

U.S. Cl. 301—5.3 **9 Claims**

1. The method of molding a precision low cost wheel comprising the steps of

molding a wheel core of butyrate polymer about wheel

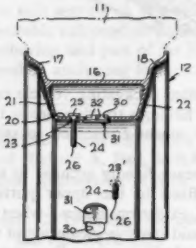
bearing parts to thereby position and lock said bearing parts within said wheel core, and molding a wheel casing of polyester polyurethane to substantially completely encase said core in close and intimate contact therewith and fusion bonding said core and casing together around the circumference of the core and inwardly along both sides of said core from the outermost circumference of said wheel toward the axis of said wheel, thereby to firmly and securely lock said casing to said core.

4,040,671

SPOKED WHEEL

Lawrence K. Hersh, 6306 Whitsett Ave., North Hollywood, Calif. 91606

Filed June 23, 1975, Ser. No. 589,202
Int. Cl.[2] B60B *1/02*
U.S. Cl. 301—58 **7 Claims**



1. A spoked wheel rim for mounting a plurality of spoke anchoring pins comprising the combination of:

a circular main rim having a pair of outwardly projecting circular flanges adapted to sealingly engage with the beads of a tubeless pneumatic tire;

a circular second rim arranged in fixed spaced apart relationship to said main rim so as to be coaxial therewith;

a plurality of holes provided in said second rim for receiving and mounting one of said spoke anchoring pins therein;

each of said plurality of holes having a diameter sufficient to receive the shank of one of said spoke anchoring pins;

an access aperture provided in said second rim between adjacent pairs of said anchoring pins whereby access is gained to the radially outer end of a pair of said spoke anchoring pins via a single one of said access apertures; and

said access aperture having a diameter substantially greater than said diameter of each of said holes so as to accept passage therethrough of the spoke anchoring pin;

closure means removably covering each of said access apertures when not in use;

said circular second rim has a center plane and said access apertures lie on said center plane in fixed spaced apart relationships; and wherein

said plurality of holes are disposed on opposite sides of said center plane.

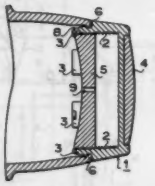
4,040,672

CENTER CAP FOR A WHEEL

Shigeyuki Imahashi, No. 27-47 Takanawa-1 Chome, Minato, Tokyo, Japan (108)

Filed Aug. 22, 1975, Ser. No. 606,948
Int. Cl.[2] B60B *7/06*
U.S. Cl. 301—108 A **3 Claims**

1. A center cap for a wheel hub having an open end and an inwardly directed annular protruding part on the edge of the hub open end comprising, in combination, a cylindrical cap body having an open end, a plurality of circumferentially spaced, elastically deformable joint ratchets on the open end edge of said body, the outer periphery of said body having an annular groove adjacent the inner end of said joint ratchets for receiving said protruding part in the assembled position of said cap on said wheel hub and the outer periphery of said joint ratchets having a beveled surface extending inwardly from said groove to the free end of said ratchets for sliding engagement with said protruding part and an axially movable restrict member means within said cap body for moving between an inoperative position remote from said joint ratchets and an operative position in underlying concentric relationship with said joint ratchets for preventing elastic deformation of said joint ratchets in an inwardly radial direction, said restrict member means comprising a circular member wherein the outer periphery of said circular member is provided with threads for engagement with a spiral guide groove formed in the inner surface of said cap body to permit said axial movement of said circular member and including a slit disposed centrally in said circular member accessible to a driving device from the inside of said wheel hub for moving said circular member axially between its operative and inoperative positions.

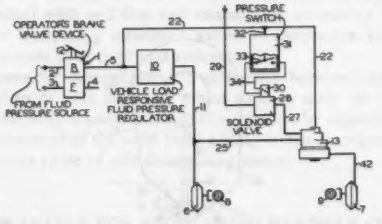


4,040,673

FLUID PRESSURE OPERABLE BRAKE APPARATUS WITH LOAD-COMPENSATING MEANS FOR VEHICLES WITH TANDEM REAR AXLES

Gerhard Ahaus, Fellbach; Siegfried Netzer, Waiblingen, and Hans-Peter Liebig, Esslingen, all of Germany, assignors to WABCO Westinghouse GmbH, Hannover, Germany

Filed Oct. 21, 1976, Ser. No. 734,391
Claims priority, application Germany, Nov. 3, 1975, 2548975
Int. Cl.[2] B60T *8/22*
U.S. Cl. 303—6 C **9 Claims**



1. Fluid pressure operable brake apparatus for vehicles having tandem rear axles including a driving axle and a trailing axle and respective brake cylinders therefor, said brake apparatus comprising:

a. a first source of fluid under pressure;

b. first means for effecting supply of a first braking pressure from said first source to the driving axle brake cylinders at a selected degree;

c. second means interposed between said first means and said driving axle brake cylinders for modifying said first braking pressure supplied to said driving axle brake cylinders according to vehicle load;

d. a relay valve means being formed therein with a first pressure area, a second pressure area, and a third pressure area, each sealingly isolated form the others, said relay valve means connected in parallel relation to said first

means and to said second means and actuable for effecting supply of a second braking pressure therefrom to the trailing axle brake cylinders at a degree of pressure determined by the combined effect of a first actuating pressure from said first means acting on said first pressure area and a second actuating pressure from said second means acting on said third pressure area;

e. a second source of fluid at a controlled pressure; and

f. third means connected in parallel relation to said first means, to said relay valve means, and to said second source, and including a valve device normally occupying a closed position in which communication between said second source and said relay valve means is cut off,

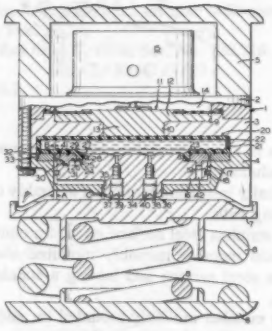
g. said third means being operable responsively to said first actuating pressure at a degree greater than a change-over pressure for effecting operation of said valve device to an open position in which fluid from said second source is communicated to said relay valve means for effecting supply of braking pressure to said trailing axle brake cylinders at a degree determfined by the combined effect of said first actuating pressure from said first means acting on said first pressure area, said second actuating pressure from said second means acting on said third pressure area, and said controlled pressure acting on said second pressure area.

4,040,674

VEHICLE LOAD FORCE PROPORTIONING DEVICE

Roger Marcillaud, Clichy sous Bois, France, assignor to WABCO Westinghouse, Freinville-Sevran, France

Filed June 7, 1976, Ser. No. 693,359
Int. Cl.[2] B60T *8/22*
U.S. Cl. 303—22 R **9 Claims**



1. A vehicle load force proportioning device for translating the load force into an operating force for a vehicle brake control device, said force proportioning device comprising:

a. a housing;

b. first piston means reciprocably operable in said housing with a first radial clearance therebetween and on which the vehicle load force is applied;

c. second piston means reciprocably operable in said housing in axial alignment with and having an effective pressure area of different dimension than said first piston means;

d. a resilient transfer member sandwiched between and having opposite sides thereof in abutting contact with respective adjacent pressure areas of said first and second piston means for transferring said vehicle load force from said first piston means to said second piston means and either reducing or amplifying said load force according to the relative dimensions of said pressure areas; and

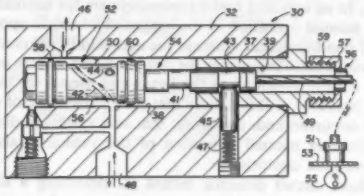
e. a securing ring concentrically and peripherally carried by said first piston means adjacent said transfer member, said securing ring being of such diametrical dimension as to form a second radial clearance adjacent the resilient transfer member smaller than said first radial clearance for inhibiting extrusion of the transfer member into said second radial clearance.

4,040,675

ANTI-THEFT VEHICLE BRAKE-SUPERVISING DEVICE

Raymond Richmond, 249-20 Thornhill Ave., Little Neck, N.Y. 11362; Edward Parmer, 118 N. Waldinger St., Valley Stream, N.Y. 11580, and Edward G. Parmer, Jr., 167 Caroline Ave., Garden City, N.Y. 11530

Filed July 26, 1976, Ser. No. 708,920
Int. Cl.[2] B60T *17/16*
U.S. Cl. 303—89 **4 Claims**

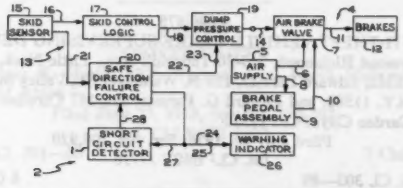


1. An anti-theft vehicle brake-supervising device of the type which selectively prevents reverse flow of a fluid from at least one vehicle wheel cylinder back to the vehicle master cylinder to thereby maintain the braking function of said fluid within said wheel cylinder, the improvement comprising wall means defining a cylindrical flow chamber of a prescribed diameter having opposite distal and proximal ends, a first fluid connection connected from said flow chamber distal end to said vehicle master cylinder, a second fluid connection connected from said flow chamber proximal end to said vehicle wheel cylinder, said first and second fluid connections cooperating to normally allow opposite direction fluid flow between said master cylinder and wheel cylinder through said flow chamber, a bypass passageway connected between said distal end of said flow chamber and said second fluid connection having a one-way valve operatively disposed therein effective to permit fluid flow only from said master cylinder into said wheel cylinder incident to utilizing said fluid to selectively immobilize said vehicle, and a cylindrically shaped flow control member having a medial portion of a prescribed smaller radius size than said cylindrical flow chamber and having enlarged diameter portions with sealing means thereon at opposite ends extending into sealing contact with said flow chamber wall to thereby define an external flow passage of a prescribed longitudinal length and in encircling relation about said cylindrical flow control member bounded at opposite ends by said sealing means, said cylindrical flow control member being operatively arranged to be manually urged through movement in said flow chamber between an operative position adjacent said proximal end thereof in which said external flow passage is in communication only with said wheel cylinder fluid connection and an operative position adjacent said flow chamber distal end in which the longitudinal length of said external flow passage extends also to said master cylinder fluid connection to thereby provide communication between said wheel cylinder and said master cylinder through said external flow passage incident to the release of said fluid immobilizing said vehicle, whereby the manual urging of said cylindrical flow control member from said proximal end to said distal end of said flow chamber to cause the release of said vehicle is aided by the pressure and flow direction of said fluid returning to said master cylinder.

4,040,676
ANTI-SKID BRAKE CONTROL SYSTEM WITH SHORT CIRCUIT PROTECTION

Yudh Vir Rajput, Dayton, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed May 11, 1976, Ser. No. 685,267
Int. Cl.[2] B60T 8/00
U.S. Cl. 303—92 5 Claims



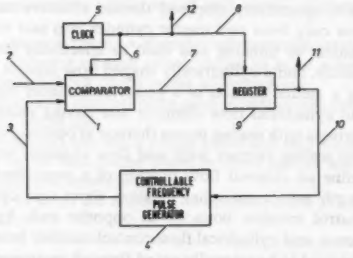
1. In an anti-skid brake control system for normally overriding manual operation of the brakes of a vehicle upon sensing a skid condition, and wherein the anti-skid brake control system includes disabling means for disabling said system upon detecting a fault condition in the latter and means for indicating to the operator of the vehicle that such a disabling of said system has occurred and, therefore, that said system is disabled from overriding manual operation of the vehicle brakes, the improvement comprising:

short circuit detector means for detecting a short circuit condition in said system at said means for indicating, said short circuit detector means being coupled in said system to effect disabling of said system from controlling the vehicle brakes upon detecting such a short circuit condition.

4,040,677
DEVICE FOR UTILIZATION IN ANTI-SKID CONTROL SYSTEMS

Hans-Wilhelm Bleckmann, Frankfurt am Main, Germany, assignor to ITT Industries, Incorporated, New York, N.Y.

Filed Apr. 30, 1976, Ser. No. 681,926
Claims priority, application Germany, May 3, 1975, 2519866
Int. Cl.[2] B60T 8/02
U.S. Cl. 303—95 10 Claims



1. A device for converting the rate of a pulse train which is proportional to the rotational velocity of a vehicle wheel into a binary number for use in a digital computer for anti-skid control systems including:

a comparator;

means for supplying said pulse train to said comparator;

means coupling the output of said comparator to the input of a storage register which cumulatively adds said pulse train to the contents of said storage register, taking into account the sign of the output signal of said comparator;

a controllable frequency pulse generator coupled to said storage register to be controlled by the contents of said storage register for producing a comparison pulse train;

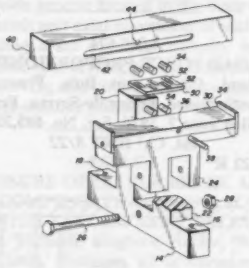
means coupling said frequency generator to an input of said comparator whereby said comparator is adapted to provide the difference between the frequency of said two pulse trains in the form of a binary number, said binary number being supplied to said storage register whereby the contents of said storage register represent the binary number corresponding to said frequency; and

a clock pulse generator for controlling said comparator and said storage register.

4,040,678
BEARING ASSEMBLY

Everett A. Rote, Corona, and Edward G. Smith, Riverside, both of Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed Nov. 28, 1975, Ser. No. 636,338
Int. Cl.[2] F16C 29/04
U.S. Cl. 308—6 R 1 Claim



1. For use in an electroplating bath environment, a bearing assembly including:

an electrically insulating mounting assembly on a fixed electroplating bath,

an upper stainless steel surface on said mounting assembly,

a reciprocal member movably mounted above the upper stainless steel surface and having a stainless steel lower surface,

a retainer member movably mounted on said upper surface with a plurality of apertures therein,

a plurality of stainless steel bearing cylinders movably mounted within the apertures of said retainer member to contact said upper and lower surfaces and constitute a roller bearing assembly,

means to impart reciprocation to said upper and lower surfaces whereby a bearing action is imparted to the moving elements by the rolling action of the cylinders,

said reciprocal member having downwardly extending flanges with a longitudinal slot formed in one of said flanges,

an aperture in said mounting assembly transverse to the direction of motion of said reciprocal member and

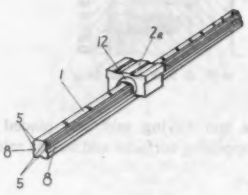
a pin slidably mounted in the aperture of said mounting assembly, said pin being movable in said aperture from a first position wherein it rides in the longitudinal slot of said reciprocal member for guiding the motion between said reciprocal member and said mounting assembly, said pin being movable in said aperture to a second position wherein it is within said aperture but not in the longitudinal slot to permit the removal of said reciprocal member from said mounting assembly.

4,040,679

SLIDE WAY BEARING

Hiroshi Teramachi, 2-34-8, Higashi-tamagawa, Setagaya, Tokyo, Japan

Filed Feb. 25, 1976, Ser. No. 661,329
Claims priority, application Japan, Feb. 28, 1975, 50-27675[U]; Feb. 28, 1975, 50-27676[U]
Int. Cl.[2] F16C *29/04*
U.S. Cl. 308—6 C 9 Claims



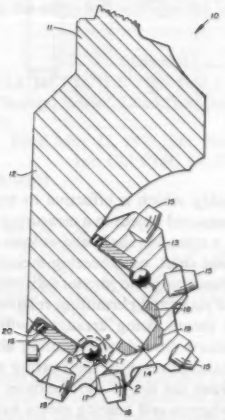
1. A slideway bearing comprising in combination an elongated bar having a track shaft part and a bed part, a slide saddle member being formed by integrating an outer sleeve part of a ball bearing assembly with a saddle part, said sleeve part and track shaft part having complementary grooves formed therein to define a bearing raceway, ball bearings disposed in said raceway and a ball retainer for maintaining said ball bearings in said raceway.

4,040,680

ROCK BIT HAVING A BALL BEARING RACEWAY WITH ANTI-GALLING MATERIAL

Wilbur S. Keller, Arlington, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Sept. 7, 1976, Ser. No. 720,716
Int. Cl.[2] F16C *19/00*
U.S. Cl. 308—8.2 10 Claims



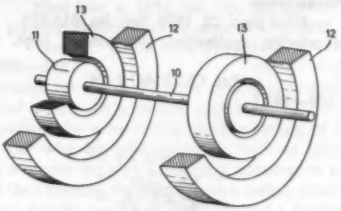
1. An earth boring bit that encounters an out thrust load, comprising:
a bit body;
a bearing pin extending from said bit body;
a roller cutter rotatably mounted on said bearing pin;
bearing means between said cutter and said bearing pin, said bearing means including a multiplicity of ball bearings;
a cooperating pair of ball bearing raceways, one raceway in said bearing pin and the other raceway in said cutter;
at least one of said ball bearing raceways having a relieved portion with the relieved portion being positioned so that said out thrust load tends to force said ball bearings toward said relieved portion; and
an anti-galling material filling said relieved portion so that said out thrust load tends to force said series of bearings toward said anti-galling material.

4,040,681

MAGNETICALLY LEVITATED OBJECT

Hendrik van der Heide, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 6, 1974, Ser. No. 467,384
Claims priority, application Netherlands, May 21, 1973, 7307042
Int. Cl.[2] F16C *39/00*
U.S. Cl. 308—10 11 Claims



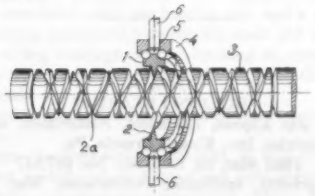
1. A magnetically levitated object comprising a first permanent support magnet, permanent magnet support means secured to the object and which via an air gap cooperates magnetically with the first permanent support magnet to levitate the object, and a stabilizing device for holding the levitated object in a stable condition and which includes means for generating a magnetic alternating field of constant amplitude in which the permanent magnet support means is disposed, the first permanent support magnet, the permanent magnet support means and the magnetic field generating means being related so that the dynamic stiffness due to the stabilizing device is greater than the static stiffness due to the first permanent support magnet and the permanent magnet support means.

4,040,682

MECHANISM FOR TRANSFORMATION OF A ROTARY MOTION INTO A TRANSLATORY MOTION OR VICE VERSA

Peder Ulrik Poulsen, Lonholt Ladegaard, DK-3480 Fredensborg, Denmark

Filed June 23, 1976, Ser. No. 698,865
Claims priority, application Denmark, July 8, 1975, 3075/75
Int. Cl.[2] F16C *19/04*
U.S. Cl. 308—176 2 Claims



1. Mechanism for transformation of a rotary motion into a translatory motion or vice versa, comprising a curve follower and a rotary cylindrical curve body, said curve body being provided with a curved guide in the shape of a track in the body, the curve follower comprising a ring with a larger diameter than that of the curved body, and located eccentrically on the body in such a manner that the inner edge of the ring

meshes with the track, the ring being the inner ring of a roller or ball bearing, characterized in that the outer ring of the bearing is pivotally mounted about an axis situated in the plane of the bearing in such a manner that this axis mainly goes through the point of engagement and preferably is at right angles to the axis of the curve body.

4,040,683

HUB BEARING UNIT

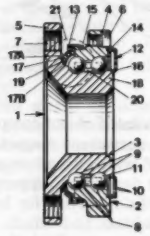
Abraham Korenhof, Driebergen, Netherlands, assignor to SKF Industrial Trading and Development Company B.V., Nieuwegein, Netherlands

Filed Sept. 22, 1975, Ser. No. 615,511

Claims priority, application Netherlands, Sept. 24, 1974, 7412565

Int. Cl.² F16C *1/24*

U.S. Cl. 308—187.1 **11 Claims**



1. A rolling bearing comprising an integrally assembled fastening flange and inner and outer races, a plurality of rolling elements between said inner and outer races, said rolling elements separated from one another by a bearing cage, and flexible material seals for sealing the area of said rolling elements and their contact surfaces for inhibiting penetration by foreign matter or loss of lubricant, at least one of said seals being fastened on one side of said rolling elements between said inner and outer races against respective first and second walls, each respective end of said seal contacting said first and second walls respectively, and means for holding said seal ends against said first and second walls, said means for holding comprising a relatively inflexible material element applied onto an exterior side of said seal out of contact with said walls and surrounding said exterior side of said seal for maintaining said seal ends in position.

4,040,684

ROLLING BEARING

Hendrikus Jan Kapaan, Ijsselstein, Netherlands, assignor to SKF Industries, Inc., King of Prussia, Pa.

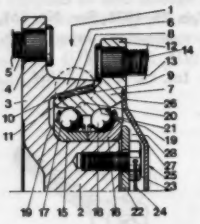
Filed Mar. 16, 1976, Ser. No. 667,517

Claims priority, application Netherlands, Mar. 18, 1975, 7503173

Int. Cl.² F16C *33/78*

U.S. Cl. 308—187.1 **23 Claims**

1. A rolling bearing comprising two rotating parts formed by an inner and outer race fitted with mounting flanges, a plurality of rows of rolling elements, separated by cages, positioned between said races, and plane sealing means for sealing said races to prevent the ingress of foreign substances while retaining any lubricant that is present in the space between said races and the seal, said plane sealing means including a space formed in a substantially axial direction by opposing surfaces of said



two rotating parts and having said seal placed therein in contact with said opposing surfaces and across said space.

4,040,685

MEASURING APPARATUS

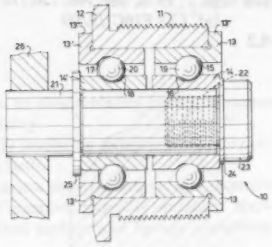
Sture Berglund, Tyreso, Sweden, assignor to Alfredeen Production AB, Bandhagen, Sweden

Filed Mar. 30, 1976, Ser. No. 672,008

Claims priority, application Sweden, Apr. 3, 1975, 7503837

Int. Cl.² F16C *19/14*

U.S. Cl. 308—189 R **6 Claims**



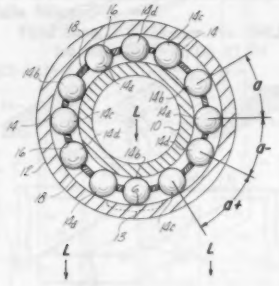
1. A bearing assembly which is effective to transmit small movements from a measured object to a measuring device, said assembly comprising a rotatable shaft, and at least two bearing means arranged on said shaft, each bearing means comprising an outer ring and an inner ring and pressure-distributing means arranged between the rings and permitting relative movement thereof, the bearing means being arranged within a sleeve having an external screw thread, and limiting abutment surfaces for fixing the axial position of the bearing means in the sleeve arranged between the sleeve and the outer ring of each bearing means, and wherein said bearing means have means for providing a variable tension effect between the respective inner rings of the bearing devices, one end of the shaft being provided with an axial boré having an internal screw thread which is intended to accommodate a screw which can be actuated from outside and which engages only the inner ring of one bearing means, the inner ring of the other bearing means being arranged to co-act with an abutment surface in a manner such that actuation of the screw causes respective inner rings of the bearing means to be moved axially relative to the two outer rings of the bearing devices, and such as to provide a tensioning effect between the screw and the abutment surfaces.

4,040,686

ANTI-FRICTION BEARING

Erwin F'Geppert, Novi, Mich., assignor to The U.S. Government as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 23, 1975, Ser. No. 625,334
Int. Cl.[2] F16C *19/20*
U.S. Cl. 308—201 1 Claim



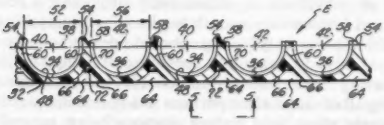
1. An anti-friction bearing comprising a load-applying annular race; a load-absorption annular race; a series of substantially identical anti-friction elements rollably engaging both races in orbiting fashion; and a separator concentric with the races, said separator engaging the anti-friction elements to maintain three different predetermined spacings therebetween; the total anti-friction element complement being an even multiple of the different element spacings, and each element spacing being repeated at regularly spaced intervals along the separator, whereby a given element spacing is in every case different than the preceding element spacing; a first one of the element spacings (a) being an even fraction of the total element spacing, a second one of the element spacings (a−) being slightly less than an even fraction of the total element spacing, and the third one of the element spacings (a+) being slightly greater than an even fraction of the total element spacing; the element spacing order being the same for each spacing group.

4,040,687

BALL RETAINER FOR BALL BEARINGS

Wilford P. Rogers, Bristol, Conn., assignor to TRW Inc., Cleveland, Ohio

Filed May 22, 1975, Ser. No. 580,059
Int. Cl.[2] F16C *19/20*
U.S. Cl. 308—201 4 Claims



1. Apparatus comprising a generally cylindrical ball bearing retainer member having a longitudinal axis, a plurality of ball receiving pockets circumferentially-spaced substantially equidistantly around one axial side of said cylindrical member and having pocket entrance openings which open axially outwardly generally parallel to said axis, said pockets including a plurality of first pockets having first entrance openings defined between opposite outwardly yieldable fingers having finger tips spaced apart a distance less than the maximum width of each said first pocket, a plurality of second pockets having second entrance openings, said second entrance openings being defined by portions of said cylindrical member other than yieldable fingers and being of greater width than said first entrance openings, said first pockets being separated from one another by at least one of said second pockets, said pockets having centers and said first entrance openings being spaced outwardly from said centers of said first pockets a substantially greater distance than the spacing of said second entrance openings from said centers of said second pockets, adjacent pockets having common walls, and said yieldable fingers each having a thickness over a major portion of their length which is greater than one-half the thickness of each said common wall measured on a line extending between the centers of adjacent pockets.

4,040,688

NOVEL CYLINDRICAL ROLLERS

Karl-Ludwig Grell, Aurachtal, Germany, assignor to Industriewerk Schaeffler OHG, Herzogenaurach, Germany

Filed Nov. 4, 1974, Ser. No. 520,621
Claims priority, application Germany, Dec. 8, 1973, 2361330
Int. Cl.[2] C21D *9/64;* F16C *33/26*
U.S. Cl. 308—202 3 Claims

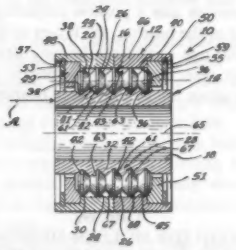
1. A process for the preparation of rollers comprising hot rolling steel wire with a carbon content of 0.7 to 1.2% by weight, cooling the wire during or after coiling of the wire, reducing the wire by cold reduction without intermediate annealing whereby the wire hardness is increased to at least 50 HRC and then forming the rollers with a carbon content of 0.7 to 1.2% by weight, a sorbitic structure and a hardness of at least 50 HRC.

4,040,689

ANTIFRICTION ROLLER BEARING

Richard B. Stanley, 17763 G Drive North, Marshall, Mich. 49068

Continuation-in-part of Ser. No. 449,699, March 11, 1974, Pat. No. 3,963,286. This application Jan. 16, 1976, Ser. No. 649,694
Int. Cl.[2] F16C *13/00*
U.S. Cl. 308—205 12 Claims



1. In a rolling bearing assembly defining a bearing axis and including an inner race, an outer race disposed about the inner race and concentric with the bearing axis, and a plurality of rolling bearing interposed between the inner and outer races, with the rolling bearings each comprising an elongate roller defining a shank intermediate the ends thereof, the improvement wherein:

the inner race is formed to define an inner raceway thereabout,

said inner raceway and said shanks of said rollers being formed to define right flanges and right grooves in substantially complementing interfitting relation forming the areas of rolling engagement of the rollers with the inner race raceway,

said rollers each defining a thrust bearing surface at either end of same that is angled relative to the longitudinal axis of the respective rollers, and

radial load transmitting surfacing in circumambient relation about the respective rollers,

said areas of flanges and grooves of said roller shanks form-

ing a plurality of thrust transmitting faces that are angled relative to the longitudinal axis of the respective rollers,

said outer race defining outer raceway surfaces thereabout on which said roller surfaces and surfacing respectively ride in rolling engagement therewith,

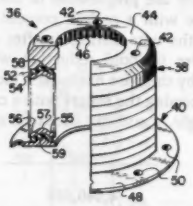
with said roller bearing surface angulation being greater than said thrust transmitting face angulation.

4,040,690

LAMINATED BEARING

Robert H. Finney, Erie, Pa., assignor to Lord Corporation, Erie, Pa.

Filed Nov. 17, 1975, Ser. No. 632,423
Int. Cl.[2] F16C *9/00*
U.S. Cl. 308—237 R **16 Claims**



1. A laminated bearing comprising a plurality of alternating and bonded layers of elastomeric material and nonextensible material, said layers alternating along a common axis extending lengthwise of the bearing so as to permit the bearing to support compressive loads applied generally normal to the layers and to accommodate torsional loads applied about said common axis, each layer being contoured to have in section taken radially of said common axis a portion projecting longitudinally toward one end of the bearing, the layers of elastomeric material adjacent said one end of the bearing having larger compression moduli than layers of elastomeric material located more centrally along the length of the bearing.

4,040,691

WAVEGUIDE HOLDER-HUMIDIFIER

Donald J. David, Centerville, and Michael C. Willson, Waynesville, both of Ohio, assignors to Monsanto Research Corporation, St. Louis, Mo.

Continuation-in-part of Ser. No. 689,403, May 24, 1976, abandoned. This application Sept. 20, 1976, Ser. No. 724,482
Int. Cl.[2] A47B *81/00*
U.S. Cl. 312—31 **5 Claims**

3. A coated waveguide holder-humidifier for a gradient light analytical detector, comprising:

A. a cylindrical container having a removable end,

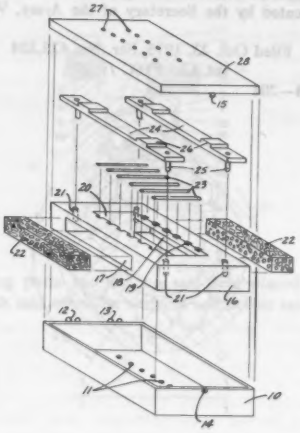
B. a cylindrical stem attached to and depending from said removable end and said stem having an enlarged cylindrical base,

C. a spring around said stem and adjacent said removable end,

D. a hollow cylindrical frame positional around said stem below said spring with flanges at the top and bottom of said stem, a notch in the under side of the top flange and a hole through the bottom flange for a waveguide,

E. a porous material capable of absorbing water and desorbing water vapor, located in the other end portion of said container,

F. opening means to the side of said container, said opening means being covered with screen material to exclude



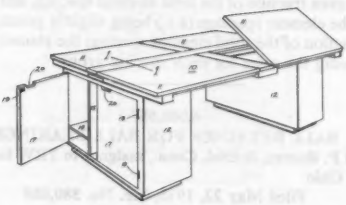
particulate matter but provide for a fluid sample to enter said container.

4,040,692

CONVERTIBLE MULTIPURPOSE TABLE

Daniel B. Sass, 27 High St., Alfred, N.Y. 14802; William A. Earl, 1571 Waterwells Road; Joseph Fasano, B. D., both of Alfred Station, N.Y. 14803

Filed June 6, 1975, Ser. No. 584,462
Int. Cl.[2] A47B *27/00*
U.S. Cl. 312—194 **4 Claims**



1. A multiple purpose unitary convertible work table having inclinable surface portions for separately accomodating a plurality of individuals or alternatively providing a relatively large and substantially smooth work surface comprising:

a table top assembly having opposed sides and opposed ends, said table top assembly consisting of a support member having corresponding opposed sides and ends for supporting all of said surface portions in a horizontal position in a single plane, said surface portions being generally disposed lengthwise along each of said opposed sides and on top of said support member in parallel planar relation and being adapted to be selectively moved from a horizontal position to an incline position, hinge means connecting the outermost lengthwise edge of each surface portion to one of the opposed sides of said support member for allowing each of said surface portions to be pivotally moved from a horizontal position to an incline position, incline support means associated with each of said surface portions for holding said surface portion in an incline position when moved thereto, and a surface member connected to said support member and fitting between and immediately adjacent said surface portions when said surface portions are disposed in said horizontal position to form a substantially smooth work surface;

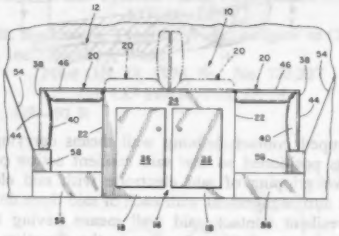
table support means for supporting said table top assembly in a substantially horizontal position; and

a base member having connecting means for connecting said table top assembly to said table support means.

4,040,693
GALLEY UNIT

Edward W. Peterson, Lake Bluff, and Charles J. Bednar, Oak Park, both of Ill., assignors to Arctic Enterprises, Inc., Thief River Falls, Minn.

Filed June 23, 1975, Ser. No. 589,337
Int. Cl.[2] A47B *77/08, 85/04*
U.S. Cl. 312—236 **2 Claims**



1. In a boat having a hull with a floor, the improvement of a multipurpose galley assembly which includes a storage enclosure and which is convertible from a galley to furniture for sleeping and to furniture for seating, said assembly comprising, in combination:

a. an upright base mounted on the floor of the hull, said base having an upper portion and a lower portion with at least one side,

b. abutments in the floor of the hull on opposite lateral sides of the base, distinct from said one side,

c. a kitchen galley unit located in said upper portion of said base and being at a work level height, said lower portion defining a storage space below said kitchen galley unit and having access from said one side,

d. a cover unit hingedly connected to the upper portion of said base, said cover unit having a first position for covering said kitchen galley unit and for supporting a person in a seated position and having a second position for defining work areas adjacent to and on opposite lateral sides of said kitchen galley unit and furniture for sleeping, said cover unit comprising:

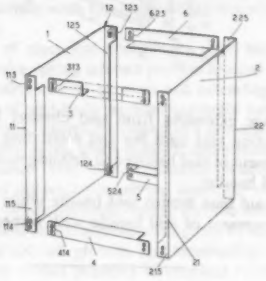
1. a pair of seats, each seat having a seat bottom with a front edge and a seat back with top edge, said bottom and back being connected at substantially right angles to each other, each seat also including a horizontal work surface portion defining the seat bottom, each of said seats being hingedly connected at said front edge to one of the opposite lateral edges of said base, each of said seats being pivotal to the first position about the seat hinge connection to cover a portion of the top of the kitchen galley unit with each of said seat backs being at a substantially upright position for supporting a person's back, said seat backs being in back-to-back relationship to each other when said cover unit in the first position; and each of said seats pivotal to the second position about the hinge connection, each of said seat backs defining upright supports for the work surface portions by cooperative engagement of the top edge of each seat back with each abutment in the floor of the hull to hold each of said horizontal work surface portions in a substantially horizontal position on opposite lateral sides of said kitchen galley unit; and

2. a separate cover member hingedly connected to the back edge of said base and covering said kitchen galley unit below said seat bottoms when in said first position, and defining a continuous surface with each of said horizontal work surface portions of said seats when said seats are moved to the second position to provide a sleeping surface, and pivotal from the kitchen galley unit when the seats are in the second position to provide a kitchen galley unit with lateral work surface portions.

4,040,694
FRAMEWORK FOR METAL CABINET

Alain Lascarrou, Epinay-sur-Seine, France, assignor to La Telemecanique Electrique, France

Filed Dec. 3, 1975, Ser. No. 637,256
Claims priority, application France, Dec. 12, 1974, 74.40883
Int. Cl.[2] A47B *47/02;* **F16B** *21/00*
U.S. Cl. 312—263 **4 Claims**



1. A metal enclosure, for electrical equipment, having a frame including:

i. a plurality of post elements

ii. a plurality of cross-arm elements at least two of which are utilised to connected pairs of the post elements, and

iii. means for releasably fastening the post elements to the cross-arm elements with a face of the post element abutting a face of the cross-arm element, said fastening means comprising

a. a portion of one of said elements having therein a circular hole opening at the abutting face,

b. a first annular portion extending from the abutting face of the other element and having a cylindrical external face forming a fit in the circular hole,

c. a second annular portion extending from the first annular portion remote from the abutting face said second annular portion being externally frusto-conical and reducing in diameter in the direction away from said abutting face,

d. releasable holding means to bear against the two elements to retain the respective faces in abutment.

4,040,695
FLIP HANDLE

Dale A. Brann, 1600 N. Wilmot Road No. 213, Tucson, Ariz. 85712

Filed May 17, 1976, Ser. No. 687,021
Int. Cl.[2] A47B *88/00*
U.S. Cl. 312—320 **5 Claims**

1. A flip handle for drawer fronts and the like, said flip handle comprising in combination:

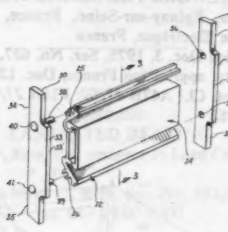
a. a pair of supports for securing said flip handle to the drawer;

b. a base for mounting said flip handle within the drawer front intermediate said pair or supports, said base including a channel partially closed upon itself and having a cross-section defining an arc;

c. a handle positionally pivotable from a first position flush with the face of the drawer to a second position, said handle in mechanical engagement with said base, said base leg having a bulbous edge with a cross-section defining a

longitudinal segment of a cylinder commensurate with the arced section of said channel for retainingly engaging said channel;

d. a bumper disposed upon said base for restricting downward pivotal movement of said handle and defining said first position of said handle; and



e. a flange extending from said channel for interferingly contacting said base leg and restricting upward pivotal movement of said handle and defining said second position of said handle;

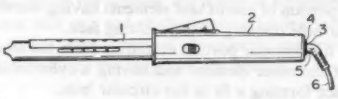
whereby, said base retains said handle while accommodating pivotal movement of said handle with respect to the drawer front.

4,040,696

ELECTRIC DEVICE HAVING ROTARY CURRENT COLLECTING MEANS

Yukio Wada; Yoshinori Abura, and Takeshi Matsui, all of Hikone, Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan

Filed Apr. 23, 1976, Ser. No. 679,661
Claims priority, application Japan, Apr. 30, 1975, 50-52948
Int. Cl.² H01R *39/00*
U.S. Cl. 339—8 R **20 Claims**



1. An electric device having rotary current collecting means comprising a current collecting block which comprises an electric source cord, a first cnductor carrier for carrying an end part of said cord penetrating axially through said carrier and a current feeding conductor connected with the cord and a second conductor carrier having axial end parts, the second conductor carrier mounting a current collecting conductor brought into contact with said current feeding conductor of said first carrier, means for supporting the first carrier rotatably substantially at both axial end parts of said second carrier, and an electric device body including a load and housing therein said current collecting block, the body having means for engaging said second conductor for holding it stationary, the first conductor carrier being rotatable therein.

4,040,697

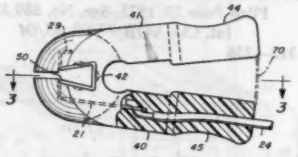
ELECTRICAL CONNECTOR

Donald C. Ramsay, Braintree, and James M. Tantillo, Brockton, both of Mass., assignors to Component Manufacturing Service, Inc., West Bridgewater, Mass.

Filed Apr. 7, 1976, Ser. No. 674,397
Int. Cl.² H01R *11/22*
U.S. Cl. 339—61 R **6 Claims**

1. An electrical connector comprising a resilient metallic stamped contact defining a narrow neck reentrant contact area entrance and having extension ends on either side of said area carrying means for engaging a plastic body,

a plastic body section embedding said extension ends and providing two side by side legs extending from said area arranged to act as levers so that pressure on said legs resiliently opens said narrow neck to allow entrance of an electrode contact and relaxation of pressure cause resilient spring action of said stamped contact to provide gripping of said electrode,



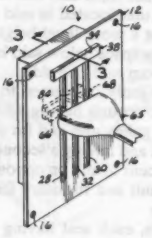
said stamped contact defining wall means carrying three detents positioned so that said resilient action provides positive gripping of said electrode with said electrode urged into engagement with each of said three detents of said resilient contact, said wall means having sections converging towards each other in the direction of said reentrant contact area entrance.

4,040,698

ELECTRICAL SAFETY OUTLET AND PLUG

Nilson V. Ortiz, San Francisco, Calif., assignor to Nilson V. Ortiz and Francisco R. Rollojay, both of San Francisco, Calif.

Filed Oct. 12, 1976, Ser. No. 731,603
Int. Cl.² H01R *13/44, 13/54*
U.S. Cl. 339—75 P **5 Claims**



1. An electrical safety outlet and plug, comprising:

an elongated casing having a back wall and a face plate;

a pair of longitudinally extending spaced conductor strips within said casing,

each said conductor strip comprising a forward member disposed adjacent said face plate and a rearward member parallel with said forward member and spaced toward said casing back wall,

said face plate having a pair of spaced longitudinal slots aligned with said conductor strips for longitudinally slidably receiving the conductor prongs of an electric plug,

said face plate having an intermediate longitudinal slot disposed between the pair of slots and having a transverse slot in one end portion communicating with the pair of slots and the intermediate slot;

an electric plug having a body portion enclosing one end portion of a pair of conductor wires;

a pair of conductor prongs secured at one end portion to the respective said wires within said plug body in parallel equally spaced relation with repsect to said pair of face plate slots,

the other end portion of each conductor prong projecting

laterally of its said one end portion in the planes of the parallel end portions;

a nonconductor prong slidably received by the face plate intermediate slot and secured at one end portion within said plug body between said pair of conductor prongs and having an opposite end portion projecting laterally of its first said one end portion parallel to the plane of said conductor prongs other end portions; and,

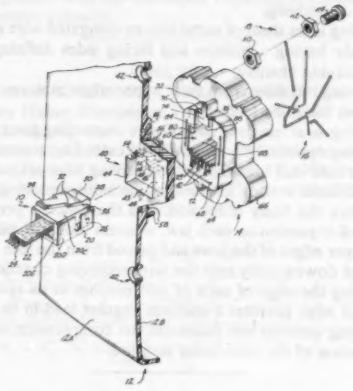
plunger means normally closing the face plate transverse slot.

4,040,699

FEMALE CONNECTOR AND ESCUTCHEON PLATE COMBINED THEREWITH FOR TELEPHONE EQUIPMENT

Harry R. Rasmussen, Tacoma, Wash., assignor to Crest Industries, Inc., Puyallup, Wash.

Filed Oct. 18, 1976, Ser. No. 733,227
Int. Cl.[2] H01R *9/08, 13/54*
U.S. Cl. 339—91 R **8 Claims**



1. An electrical termination including a female connector for telephone equipment which is adapted to be installed in wall-mounted outlet receptacles having pulled therein a plurality of electrical leads, and for use with a male connector including a body formed from dielectric material, the body being of substantially parallelopiped configuration and having a front surface and an adjoining lower surface, the male connector further including a plurality of metallic, flat blade contacts disposed in the body and spaced apart from each other, the flat blade contacts being exposed to the exterior of the body through the front and lower surfaces thereof, said electrical termination comprising:

a. plate means formed from dielectric material and including means for securing said plate means to the outlet receptacle, said plate means having a front surface, a back surface, and a connector-receiving aperture defined therein by a plurality of surfaces, including a lower surface, extending from said front surface to said back surface, said connector-receiving aperture being generally complementary to the body of the male connector;

b. a body member fromed from dielectric material and having a first surface and a second surface, a connector-receiving cavity being defined in said body member and extending inwardly from said first surface to a rear surface situated within said body member, said body member being joined to said plate means and with said first surface of said body member being adjacent to said rear surface of said plate means, said cavity being also defined by a plurality of surfaces including a lower surface, extending from said first surface to said rear surface which generally correspond to and which are aligned with said plurality of surfaces and said plate means in assembly so that said connector-receiving cavity is also complementary to the body of the male connector, a plurality of bores being defined in said body member and spaced apart from each other and extending through said body member from said first surface to said second surface, a plurality of first grooves spaced apart from each other in said lower surface of said connector-receiving cavity and extending from said first surface inwardly, each of said plurality of first grooves communicating adjacent said first surface with a corresponding one of said plurality of bores, a plurality of terminal-receiving cavities extending inwardly into said body member from said second surface, and a plurality of second grooves in said second surface of said body member, each of said plurality of second grooves interconnecting one of said plurality of terminal-receiving cavities with a corresponding one of said plurality of bores;

c. a plurality of electrical conductors, each being formed into a first wire spring contact portion located within one of said plurality of first grooves and extending from said first surface of said body member inwardly into said connector-receiving cavity for engaging a corresponding one of the plurality of flat blade contacts upon insertion of the male connector into said connector-receiving cavity through said connector-receiving aperture, each of said plurality of conductors also being formed into a second portion located in the corresponding one of said plurality of bores and second grooves and terminating in a corresponding one of said plurality of terminal receiving cavities; and

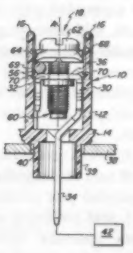
d. a plurality of electrical terminal means, each of said electrical terminal means being located within one of said plurality of terminal receiving cavities and providing electrical interconnection between the termination of the corresponding one of said plurality of electrical conductors located therein and one of the pluality of leads in the outlet receptacle.

4,040,700

ELECTRICAL TERMINATING DEVICE

Edward A. Obuch, Linden, N.J., assignor to Amerace Corporation, New York, N.Y.

Filed Feb. 24, 1976, Ser. No. 661,012
Int. Cl.[2] H01R *9/08*
U.S. Cl. 339—95 R **14 Claims**



1. In an electrical terminating device of the type having an electrical terminal member and a clamping means for detachably connecting a conductive element to the terminal member, the improvement comprising:

an electrical terminal member having a platform for receiving a conductive element to be detachably connected to the terminal member;

clamping means including a clamping surface juxtaposed with the platform and selectively movable toward and away from the platform for selectively clamping or releasing the conductive element from between the clamping surface and the platform when the conductive element

extends in a longitudinal direction between the clamping surface and the platform;

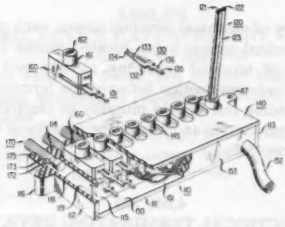
at least one resiliently deflectable cantilevered projection unitary with the terminal member and extending laterally relative to said longitudinal direction, said tang having a remotely extending free end and a pair of opposed side edges, each of said side edges being spaced inwardly from the longitudinal extremities of said platform, said tang extending upwardly toward the clamping surface, and at an acute angle to the platform such that upon clamping the conductive element between the clamping surface and the platform, the projection will be deflected resiliently and will establish a resilient clamping force upon the conductive element tending to confine the conductive element between the clamping surface and the platform.

4,040,701

QUICK CONNECTOR FOR SERVICE WIRES

Tillman Johnson Gressitt, Long Valley, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed July 30, 1976, Ser. No. 710,020
Int. Cl.[2] H01R *9/08*
U.S. Cl. 339—99 R **19 Claims**



1. A wire terminal block including

at least one pair of insulation penetrating quick-connect terminals, each of said terminals having provision therein for making an electrical connection with opposite sides of an insulation covered electrical conductor,

means for accepting a coupled pair of insulation covered electrical conductors, said accepting means including

a generally rectangular-shaped member,

first and second grooves in opposite sides of said member, said grooves displaced from one another so as to be in alignment with said pair of insulation penetrating quick-connect terminals,

means, integral with and extending outwardly from a central portion of said rectangular-shaped member, for receiving said coupled pair of insulation covered electrical conductors, said receiving means having a generally oval-shaped aperture therein which extends through said rectangular-shaped member, an axis of said oval-shaped aperture perpendicularly intersecting first and second parallel planes containing said first and second grooves, and

first and second depressions having faired entry faces at a terminus of said first and second grooves, said depressions juxtaposed said oval-shaped aperture to reduce insulation buildup as said quick-connect terminals make electrical connection with said insulation covered electrical conductor, and

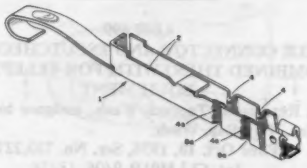
means for urging said accepting means and said pair of insulation penetrating quick-connect terminals into engagement with one another.

4,040,702

SOLDERLESS TERMINATION SYSTEM

William H. McKee, West Covina, Calif., and Roy Witte, Rolling Meadows, Ill., assignors to TRW Inc., Elk Grove Village, Ill.

Continuation of Ser. No. 589,308, June 23, 1975, abandoned, which is a division of Ser. No. 443,678, Feb. 19, 1974. This application Oct. 6, 1976, Ser. No. 730,561
Int. Cl.[2] H01R *11/20*
U.S. Cl. 339—97 R **18 Claims**



1. The method of making an electrical wire termination system comprising:

forming a flat sheet of metal into an elongated wire receiving body having a bottom and facing sides defining a wire receiving channel;

notching the sides from their upper edges at areas at which jaws are to be formed;

forming-in at least one pair of wire contacting jaws, the jaws being oppositely positioned and extending transversely of the side and into the wire receiving channel, to receive and hold a wire inserted in the wire receiving channel when the body is formed, and the notches providing a lead-in portion on each jaw, wherein the notch edges form upper edges of the jaws and extend from the side inwardly and downwardly into the wire receiving channel; and

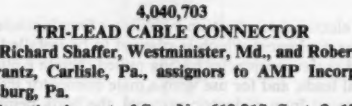
coining the edge of each of said notches at its apex so that said edge presents a uniform angular lead-in to the wire being inserted and facilitates the compression and deformation of the wire being inserted.

4,040,703

TRI-LEAD CABLE CONNECTOR

Howard Richard Shaffer, Westminister, Md., and Robert Houston Frantz, Carlisle, Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 610,815, Sept. 9, 1975, abandoned. This application June 28, 1976, Ser. No. 700,370
Int. Cl.[2] H01R *13/38*
U.S. Cl. 339—99 R **11 Claims**



1. An electrical connector assembly for terminating multi-conductor cable with contacts enabling electrical connection with other electrical terminating means comprising:

a connector housing having first and second mating housing members of substantially rigid first insulator material, said mating members together defining therebetween at least first and second contact receiving cavities and at least one cable receiving recess, and at least one integral stud on each said housing member;

hinge means joining said housing members together and comprising a web of flexible second insulator material having a plurality of apertures therein, said studs of said mating housing members passing through said apertures

and being bonded thereto thereby forming an integral housing assembly;

latching means integral with said housing members spaced remote from said hinge means and adapted to detachably secure said mating members together in a closed condition;

a first contact having an insulation piercing conductor engaging portion and a matable portion, said first contact being received in said first cavity of said first housing member with said conductor engaging portion directed toward the second of said housing members,

a second contact having an insulation piercing conductor engaging portion and a matable portion, said second contact being received in the second cavity of said housing member with said conductor engaging portion directed towards the first of said housing members; and

said at least one cable receiving recess having a transverse profile defined by at least two members fitting together in an interdigitated fashion whereby adjacent conductors of a cable inserted therein will be displaced in opposite directions into two parallel spaced planes and be driven into engagement with the conductor engaging portions of the respective contacts.

4,040,704

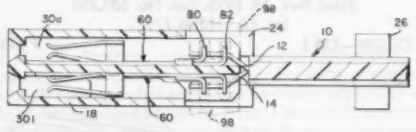
COAXIAL RIBBON CABLE CONNECTOR

John Henry Huber, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 528,294, Nov. 29, 1974, abandoned, which is a division of Ser. No. 391,727, Aug. 27, 1973, Pat. No. 3,864,011. This application June 30, 1976, Ser. No. 701,266

Int. Cl.[2] H01R *9/08*

U.S. Cl. 339—99 R **1 Claim**



1. A connector for terminating ribbon coaxial cable of the type having a plurality of signal carrying wires and parallel drain wires, which comprises:

a. a housing of insulating material having a plurality of cavities extending from front to back thereof, said cavities being arranged in upper and lower rows, and further opening out vertically and rearwardly at the rear end of the housing to provide contact openings with the contact openings in the upper row being opened vertically upwardly and the contact openings in the lower row opening vertically downwardly; and

b. a plurality of conductive contact members positioned in the cavities, each contact member comprising:

i. an elongated flat base having first and second ends;

ii. means on the first end for engaging contact elements on other electrical circuits;

iii. a first terminal formed at and from the second end of the base, said end being bent upwardly to provide a vertical portion, a wire-receiving slot extending through the vertical portion and into a portion of the adjacent horizontal base; and

iv. a second terminal having vertical and horizontal portions relative to the base, a wire-receiving slot extending through the vertical and into the horizontal portions, said second terminal being positioned inwardly from the first terminal and in overlying relation to the base and attached thereto by a section of material extending from the horizontal portion to a side of the base so that the second terminal may be moved independently from the first terminal and the base.

4,040,705

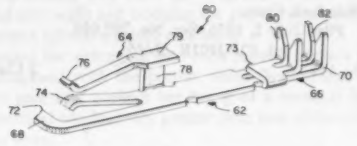
COAXIAL RIBBON CABLE CONNECTOR

John Henry Huber, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 675,838, April 12, 1976, abandoned, which is a continuation of Ser. No. 564,501, April 2, 1975, abandoned, which is a division of Ser. No. 507,170, Sept. 18, 1974, Pat. No. 3,907,396, which is a division of Ser. No. 391,727, Aug. 27, 1973, Pat. No. 3,864,011. This application Feb. 8, 1977, Ser. No. 766,632

Int. Cl.[2] H01R *13/38*

U.S. Cl. 339—99 R **1 Claim**



1. A contact member stamped and formed from a coplanar sheet of conductive material, which comprises:

a. an elongated flat base having first and second ends;

b. means on the first end for engaging contact elements on other electrical circuits;

c. a first terminal formed at and from the second end of the base, said end being bent upwardly to provide a vertical portion, a wire-receiving slot extending through the vertical portion and into a portion of the adjacent horizontal base; and

d. a second terminal having vertical and horizontal portions relative to the base, a wire-receiving slot extending through the vertical and into the horizontal portions, said second terminal being positioned inwardly from the first terminal and in overlying relation to the base and attached thereto by a section of material extending from the horizontal portion to a side of the base so that the second terminal may be moved independently from the first terminal and the base.

4,040,706

CONTACT STRIP

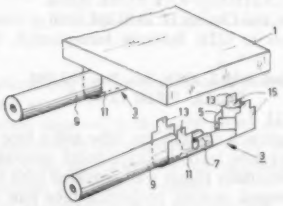
Gijsbert Frederik Maria De Bresser; Teunis Adrianus Kassenaar; Ludovicus-Gerardus Johannes Godefrida Veraa, and Leon Pieter Weenink, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 9, 1976, Ser. No. 665,272

Claims priority, application Netherlands, Jan. 4, 1975, 7503831

Int. Cl.[2] H01R *13/58*

U.S. Cl. 339—103 R **4 Claims**



1. A contact strip comprising an electrically insulating support having an essentially flat surface, at least one linearly extending metal contact member mounted on said support by means of connection tags formed on said contact member, one end of said contact member being formed with first contact means for detachably mating with another contact means, and an insulated connection wire extending from the other end of

said contact member, the end of said connection wire having its insulation removed and being electrically and mechanically connected to the contact member, said other end of the contact member including a U-shaped extension partly enclosing the insulated portion of the connection wire, each leg of said U-shaped extension being provided with one of said connection tags, the arrangement being such that the insulated portion of the connection wire is pressed by the U-shaped extension against the support surface.

4,040,707

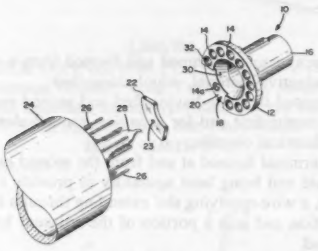
CATHODE RAY TUBE BASE

John J. Pisano, Auburn, N.Y., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed July 2, 1976, Ser. No. 702,094

Int. Cl.[2] H01R *13/46*

U.S. Cl. 339—111 **2 Claims**



1. In combination with a cathode ray tube, a base therefor, said cathode ray tube having a cylindrical terminal portion closed by a substantially planar wall provided with a plurality of annularly spaced, projecting tube pins each surrounded by a raised nubbin with a diameter larger than said pins where said pins exit from said wall, said base comprising a flat, circular rim having a diameter substantially equal to that of said cylindrical terminal portion; a plurality of tube pin receiving apertures extending through said rim for engaging said tube pins, said apertures being spaced inwardly from the outer circumference of said rim; and at least one tube pin isolating means formed within said flat circular rim, said tube pin isolating means including a cut-out portion having a depth less than the thickness of said rim and extending over a circumferential arc of less than 180° and an electrically insulating plug formed to fit said cut-out portion, said plug containing at least one aperture for receiving one of said tube pins, said one aperture having a diameter at least as large as the diameter of said nubbin.

4,040,708

CATHODE RAY TUBE BASE

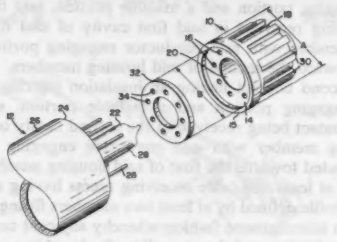
Ralph E. Neuber, and Charles H. Rehkopf, both of Seneca Falls, N.Y., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed July 2, 1976, Ser. No. 702,096

Int. Cl.[2] H01R *13/46*

U.S. Cl. 339—111 **3 Claims**

1. In combination, a cathode ray tube and a base therefor, said cathode ray tube having a cylindrical terminal portion closed by a substantially planar wall provided with a plurality of annularly arrayed, spaced, projecting tube pins each surrounded by a raised circumferential nubbin with a diameter larger than said pins where said pins exit from said wall, said base comprising: a circular rim having a given diameter surrounded by a peripheral wall having a given internal wall height; a plurality of tube pin receiving apertures extending through said rim, said apertures being spaced inwardly from the inner circumference of said peripheral wall and being annularly arrayed; a hollow, substantially centrally located crown positioned on said rim on a side opposite said peripheral wall and projecting therefrom, the internal portion of said crown being adapted to receive the terminus of an exhaust tubulation, the outside circumference of said crown having a diameter equal to the diameter of the inside edges of said tube pin receiving apertures and being further provided with a plurality of radially extending fins, said fins being located



between said apertures; and an electrically insulating, soft washer fitted within said peripheral wall, said washer having a thickness greater than the internal height of said peripheral wall and being further provided with a plurality of apertures matching in number and location said tube pin receiving apertures in said rim, said apertures having a diameter closely matching the diameter of said nubbins.

4,040,709

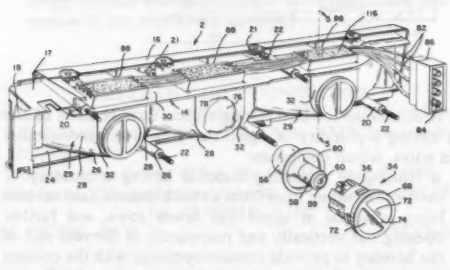
LIGHTING UNIT ASSEMBLY

Frank Peter Dola, Port Richey, and Frederick William Rossler, Jr., New Port Richey, both of Fla., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Nov. 12, 1975, Ser. No. 631,253

Int. Cl.[2] H02B *1/02*

U.S. Cl. 339—125 L **9 Claims**



1. A lighting unit assembly which is intended to be mounted in a panel from one side thereof and to be serviced from the other side thereof, said lighting unit assembly comprising:

an assembly housing having a plurality of lamp bulb sites therein, said housing being dimensioned to be inserted into said panel from said one side thereof,

a plurality of electrical conductors extending along said housing, said conductors extending past electrical tap locations adjacent to said lamp bulb sites,

electrical tap connector means at each of said tap locations, each of said tap connector means comprising a connector housing having electrical contact tap terminal means therein, each of said contact tap terminal means beings electrically connected to one of said conductors and each contact tap terminal means having a contact portion, said contact portion extending from said tap location towards the associated lamp bulb site,

a bulb holder means removably mounted in said assembly housing at each of said lamp bulb sites, each of said bulb holder means comprising a bulb holder housing of insulating material, each of said bulb holder housings being

individually mounted in said assembly housing, each of said bulb holder means having a socket for a lamp bulb, said bulb holder means and said assembly housing having cooperating mounting means for said bulb holder means, said mounting means permitting removal of said holders means from said other side of said panel,

said contact portions of said contact tap terminal means in said tap connector means being in electrical contact with bulbs in said bulb holder means whereby,

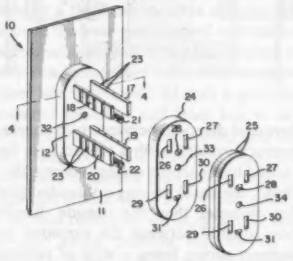
said lighting unit assembly can be assembled to said panel from said one side thereof, and said bulb holder means can be individually removed from said lighting unit assembly from the other side of said panel without disturbance to said conductors.

4,040,710

PLUG-IN ELECTRICAL RECEPTACLE EXTENDER

Arnold Marvin Damsky, 821 - 83rd St., Miami Beach, Fla. 33141

Filed May 24, 1976, Ser. No. 688,982
Int. Cl.[2] H01R *13/46*
U.S. Cl. 339—154 A **4 Claims**



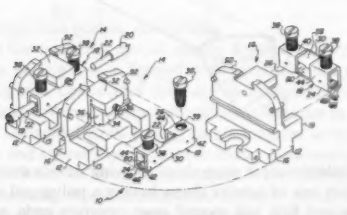
1. A plug-in electrical receptacle extender comprising, in combination, a flat electrical receptacle cover plate, a comparatively thick body member extending centrally outwardly of one side of said plate and integrally formed therewith, a plurality of electrical prong connector terminals secured in said body member and extending perpendicularly outwardly thereof at said one side of said cover plate, end portions of said prong connector terminal extensions being adapted to fit into corresponding prong terminal openings in an electrical receptacle to be extended for making electrical connection therewith, and a non-electrically conductive apertured spacer slidingly received over said prongs for electrically insulating said electrical plug terminal extensions between said body member and end portions of said extensions to be fitted into an electrical receptacle.

4,040,711

TUBULAR ELECTRICAL CONNECTOR

William T. Waddington, Fanwood; Harold F. Jenkins, Irvington, and Paul T. Filak, Roselle Park, all of N.J., assignors to Amerace Corporation, New York, N.Y.

Filed Apr. 15, 1976, Ser. No. 677,406
Int. Cl.[2] H01R *7/12, 9/10*
U.S. Cl. 339—198 R **6 Claims**



1. An electrical connector for connecting the terminal ends of electrical conductors in a terminal block assembly, said terminal block assembly including a projection thereon adapted to cooperatively engage said electrical connector, said electrical connector comprising:

first and second tubular contact members, each contact member having a bottom wall extending longitudinally between opposite ends, a top wall and opposite side walls;

the confronting ends of the bottom walls of the first and second tubular contact members and at least first ones of said top and side walls being spaced apart longitudinally such that a gap exists between the first and second tubular contact members;

a strap unitary with corresponding second ones of said top and side walls and bridging the gap between the first and second tubular contact members;

a contact bar extending into each tubular contact member, juxtaposed with the bottom walls thereof, and bridging the gap, said contact bar being of a material havng an electrical conductivity greater than that of the material of the strap;

a clamping member mounted in the top wall of each tubular contact member for clamping a conductor against the contact bar;

wherein the contact bar includes opposite end portions located within the tubular contact members against the bottom walls thereof, and an intermediate portion located longitudinally between the confronting ends of the bottom walls such that relative longitudinal movement between the contact bar and the tubular contact members is precluded by engagement of the intermediate portion with the confronting ends of the bottom walls; and

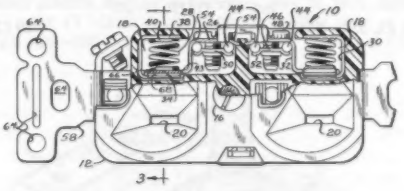
wherein the gap is adapted to engagingly receive said terminal block projection to secure the connector in the terminal block and establish an abutment between the tubular contact members, against which abutment the conductors may be placed.

4,040,712

DOUBLE-ACTING ELECTRICAL RECEPTACLE

Arvid Dahlstrom, Chicago, Ill., assignor to Dahltron Corporation, Lombard, Ill.

Filed Jan. 26, 1976, Ser. No. 652,390
Int. Cl.[2] H01R *13/16*
U.S. Cl. 339—255 R **10 Claims**



10. A double-acting electrical receptacle comprising:

body means;

contact means disposed in the body means and being connected operatively for engagement with the sides of a prong of a plug, said contact means including a bus bar, a shunt element, and resilient means;

said bus bar including extended end portions;

said shunt element being formed of a U-shaped construction and having a first side and a second side positioned oppositely and spaced apart from the first side; and

said resilient means being normally disposed in the body means between the second side of the shunt element and one of the extended end portions of the bus bar to bias them in opposite directions toward each other to resiliently urge the first side of the shunt element and one of

the extended end portions against the sides of the prong inserted therebetween.

4,040,713

DOUBLE SPRING CONTACT AND METHOD OF MAKING THE SAME

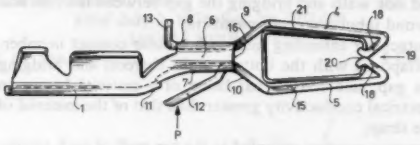
Alfred Könnemann, Wuppertal, Germany, assignor to Grote & Hartmann, Wuppertal, Germany

Filed Nov. 20, 1975, Ser. No. 633,989

Claims priority, application Germany, Nov. 21, 1974, 2455140; Oct. 2, 1975, 2544011

Int. Cl.² H01R *13/16*

U.S. Cl. 339—259 R **8 Claims**



1. A double-spring contact, comprising a one-piece body having a base part of substantially tubular configuration and having a top wall portion, a bottom wall portion parallel to said top wall portion and two curved side wall portions connecting said top and bottom wall portions; contact spring arms extending from said top and bottom wall portions at one end of said base part; a connecting portion extending from said bottom wall portion at the other end of said base part, said contact spring arms and said connecting portion all being stepped and offset at perspective bending zones in direction outwardly away from said base part; and a retaining spring arm formed from the material of said bottom wall portion and projecting outwardly away from the latter, the bending zone of said connecting portion forming an abutment shoulder, and the length of said retaining spring arm being so selected that a free end of said retaining spring arm engages said abutment shoulder when the retaining spring arm undergoes deflection in direction inwardly of said base part.

4,040,714

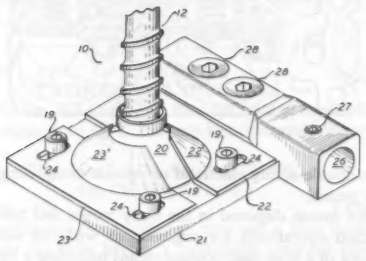
C-CLAMP GROUND ADAPTERS

Vijay K. Grover, Warren, and Woodie Zachry, Troy, both of Mich., assignors to Airco, Inc., Montvale, N.J.

Filed May 6, 1976, Ser. No. 683,857

Int. Cl.² H01R *11/26*

U.S. Cl. 339—264 R **10 Claims**



1. A C-clamp adaptor for connecting electrical cables to an object upon retention of said adapter and said object in a C-clamp comprising a base; means for connecting one or more electrical cables to said base; a plurality of adjustable cowling members for receiving one pad of a C-clamp each of said cowling members including a base portion and an angularly ascending portion with said base portion having at least one slot formed therein; and means extending through said slot for releasably securing said cowling members to said base to retain said pad in contact with said base with the secured location of said cowling members corresponding to the size of said received pad.

4,040,715

SCREW TERMINAL WITH A CAPTIVE SCREW

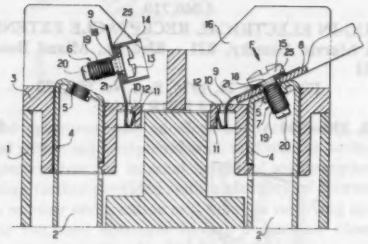
Jean Debaigt, Maisons Laffitte, France, assignor to Cgee Alsthom SA., Levallois-Perret, France

Filed Nov. 10, 1976, Ser. No. 742,136

Claims priority, application France, Nov. 26, 1975, 75.36171

Int. Cl.² H01R *9/10*

U.S. Cl. 339—272 A **5 Claims**



1. A screw terminal disposed between two cheeks and comprising a conductor provided with a tapped hole and an associated screw carried by a support spring wherein the screw has a shank and a head, the shank having a threaded portion and a neck of smaller diameter than the outside diameter of the threaded portion situated between the threaded portion and the head, he support spring being a strip of resilient material having a width substantially equal to the distance between the cheeks and having one end fixed in relation to the said conductor with the tapped hole, the support spring having a screw-retaining keyhole comprising a slot portion centrally disposed between the cheeks and parallel thereto and having a width suitable for retaining the screw by its neck, an off-center portion of the same width and an end portion of sufficient diameter to receive the threaded portion of the shank, the head of the screw once in position in the slot portion being prevented by the cheeks from sideways displacement sufficient to allow the screw to slide through the off-center portion to the end portion.

4,040,716

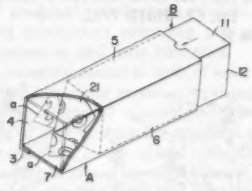
KALEIDOSCOPIC PEEP-SHOW VIEWING DEVICE

Izuru Matsubara, Kyoto, Japan, assignor to Dai Nippon Insatsu Kabushiki Kaisha and Meiji Seika Kabushiki Kaisha, both of Tokyo, Japan

Filed Mar. 8, 1976, Ser. No. 664,881

Int. Cl.² G02B *27/08*

U.S. Cl. 350—4 **10 Claims**



1. A kaleidoscopic peep-show viewing device comprising:

an outer box of tubular shape having a polygonal cross-section and first and second open opposite ends, said outer box being fabricated by folding a sheet of relatively stiff

material, said outer box further having at said first open end thereof a first bendable tab folded inwardly thereof;

an inner box of polygonal cross-section, telescopically slidable within said outer box, said inner box being fabricated by folding a sheet of relatively stiff material, said inner box further having, at an end remote from said first open end of said outer box having said first tab, a second bendable tab coupled to said inner box and folded outwardly, said first tab of said outer box and said second tab of said inner box being interposed between the mutually slidable inner and outer surfaces of said outer and inner boxes respectively and being mutually engageable to prevent the inner box from being slipped out of said outer box when said inner box is slid outward from said outer box through said open end of said outer box;

a lid wall foldably connected to said inner box at the end thereof adjacent said second open end of said outer box and closing said end of said inner box; and

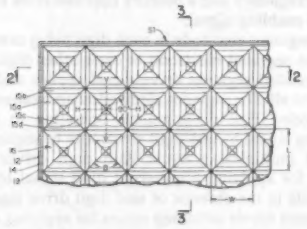
an optically reflecting member of hollow pyramidal shape fabricated by folding a sheet of material and having a base part, vertex and reflecting surfaces, said reflecting member having a third tab member coupled to said reflecting member at the base part thereof and folded to engage the surface of said lid wall facing the interior of the inner box thereby connecting said reflecting member to that end of the inner box where said lid wall is provided, said reflecting member joined to said inner box so as to extend outwardly from said inner box toward said second open end of said outer box, said outer box having on the inner surface thereof printed inscriptions which, when viewed through said second open end of said outer box, has reflections on said reflecting surfaces which are optically collected into single pictures successively appearing and disappearing as said inner box is slid within said outer box.

4,040,717

PROJECTION SCREEN FOR OPTICAL IMAGES

Alphonse P. Cinque, 65 Earle Ave., and Mark G. Cinque, 15 Elm St., both of Lynbrook, N.Y. 11563

Filed Nov. 26, 1975, Ser. No. 635,696
Int. Cl.² G03B *21/60*
U.S. Cl. 350—127 **10 Claims**



1. A projection screen, comprising:

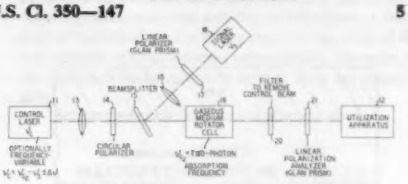
a sheet for receiving optical images projected thereon, said sheet having a face formed with a rectangular array of contiguous concavities disposed in horizontal rows and vertical columns, at least alternate concavities in each of said horizontal rows having four triangular sections apically and laterally contiguous to form a quadrangle so that the intensity of images transmitted from said face have substantially equal illumination intensity at all viewing points within a conical viewing core, where the axis of said core is coincident with the axis of optical porjection.

4,040,718

POLARIZATION ROTATOR BASED ON DISPERSION DUE TO TWO-PHOTON TRANSITIONS

Gary Carl Bjorklund, West Windsor, and Paul Foo-Hung Liao, Middletown, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jan. 5, 1976, Ser. No. 646,425
Int. Cl.² B01F *1/01*
U.S. Cl. 350—147 **5 Claims**



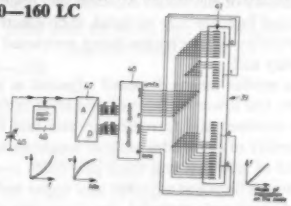
1. A magnetic-field-free polarization rotator comprising an atomic gaseous medium, means for applying to said medium a linearly-polarized beam to be polarization rotated, said beam of arbitrary frequency not coinciding with a single-photon resonance of said medium, means for applying to said medium a circularly-polarized beam of frequency complementary to that of the first beam for generating two-photon dispersion and of a power level sufficient for substantial dispersion, the frequencies and polarizations of the linearly-polarized and of the circularly-polarized beams being appropriate for determining interaction of the beams according to a quantum state selection rule, and optical filter means at the output of the rotator for removing any residual portion of the applied circularly-polarized beam, the sum of the frequency of a photon of the linearly-polarized beam and the frequency of a photon of the circularly-polarized beam being at least approximately equal to a two-photon resonance transition frequency of said atomic gaseous medium.

4,040,719

FREQUENCY INDICATOR FOR RECEIVING DEVICES

Heinz F. Schiebelhuth, Frankfurt am Main, Germany

Filed July 21, 1975, Ser. No. 597,644
Claims priority, application Germany, July 22, 1974, 2435088
Int. Cl.² G02F *1/28*; H04B *1/16*; H03J *1/04*
U.S. Cl. 350—160 LC **6 Claims**



1. A display panel having a plurality of liquid crystal elements arranged to indicate operating frequency of signal receiving means being tuned by a DC analog tuning signal having a continuously variable magnitude comprising:

logarithmic analog-to-digital converter means for converting said analog tuning signal to digitally coded signals;

decoder means responsive to said digitally coded signals for providing digital control signals; and

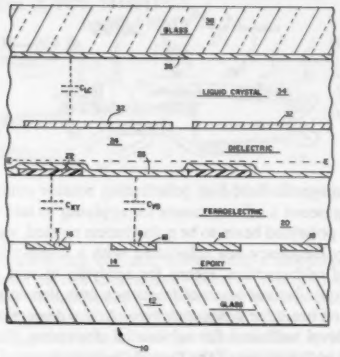
means for converting said digital control signals to an alternating current signal for operating said liquid crystal elements.

4,040,720

FERROELECTRIC LIQUID CRYSTAL DISPLAY

Paul K. York, Placentia, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Apr. 21, 1975, Ser. No. 570,115
Int. Cl.[2] G02F 1/13
U.S. Cl. 350—160 LC 3 Claims



1. A ferroelectric liquid crystal display device having a plurality of unit display cells, said device comprising:

a layer of ferroelectric material having an upper and a lower surface;

a first plurality of electrodes disposed adjacent said lower surface of said layer of ferroelectric material, each electrode in said first plurality of electrodes extending across a plurality of unit display cells;

a second plurality of electrodes disposed adjacent said lower surface of said layer of ferroelectric material, each electrode of said second plurality of electrodes being restricted to a single unit display cell;

a third plurality of electrodes disposed adjacent to said upper surface of said layer of ferroelectric material, each electrode of said third plurality extending across a plurality of unit display cells;

a fourth plurality of electrodes adjacent said upper surface of said layer of ferroelectric material, each electrode of said fourth plurality of electrodes being restricted to a single unit display cell;

capacitance spoiler means disposed adjacent at least one of said upper and lower surfaces of said layer of ferroelectric material between said ferroelectric and said first or said third plurality of electrodes at those locations at which the electrodes of said first and third pluralities overlap;

dielectric means disposed adjacent said upper surface of said layer of ferroelectric material, the electrodes of said third plurality of electrodes, and the electrodes of said fourth plurality of electrodes;

a plurality of distribution electrodes overlying said dielectric means, each of said distribution electrodes in electrical contact with one of said fourth plurality of electrodes;

a layer of liquid crystal material overlying said plurality of distribution electrodes;

transparent electrode means overlying said layer of liquid crystal material;

transparent face plate means overlying said transparent electrode means; and

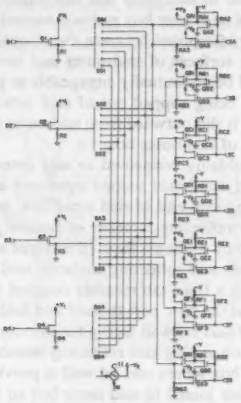
sealing means sealing the edges of said display device, thereby preventing leakage of said liquid crystal material.

4,040,721

DRIVER CIRCUIT FOR LIQUID CRYSTAL DISPLAY

Masakatsu Kurita, Nagaokakyo, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan

Filed July 14, 1975, Ser. No. 595,661
Int. Cl.[2] G02F 1/28
U.S. Cl. 350—160 LC 15 Claims



1. A driver circuit for receiving decoded segment and digit drive signals for determining application of electrical potential between predetermined segment and digit electrodes having liquid crystal material disposed therebetween to thereby form a liquid crystal display, said liquid crystal material operating to provide maximum contrast between areas underlying energized segment electrodes and surrounding areas when RMS voltage between segment and digit electrodes is at or above a saturating voltage and no contrast between such areas when RMS voltage therebetween is below a threshold voltage, said liquid crystal display having an upper cut-off frequency related to display capacitive characteristic,

comprising a digit driver for each digit in the display for switching an enabling signal to the predetermined digit electrode responsive to the decoded digit drive signal,

a segment driver for each segment in the digit for switching an actuating signal to the predetermined segment electrodes responsive to the decoded segment drive signals,

said actuating signal having a frequency below the upper cutoff frequency and a polarity opposite from the polarity of said enabling signal,

one like segment electrode in each digit being common with one like segment electrode in each other digit, whereby said decoded segment drive signal applies said actuating signal to all like segment electrodes simultaneously,

said decoded digit drive signals operating to apply said enabling signal to said digit electrodes in sequence within a digit multiplexing cycle, said digit driver including means for applying a quiescent digit signal to said digit electrode in the absence of said digit drive signal,

said segment driver including means for applying a quiescent segment signal to said segment electrodes in the absence of said segment drive signal,

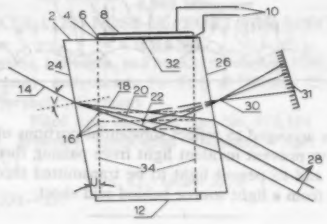
means for adjusting the amplitude of said actuating signal, so that the RMS value of the difference between said enabling and actuating signals during one digit multiplexing cycle at an actuated segment is greater than said saturation voltage, and

means for adjusting the amplitude of said quiescent segment signal, so that the RMS value of the difference between said digit and segment quiescent signals during one digit multiplexing cycle at a quiescent segment is less than said threshold voltage, whereby maximum contrast appears in the display at actuated segments and ghost displays at quiescent segments are eliminated.

4,040,722
LIGHT BEAM CONTROLLER

Asger Torben Nielsen, Fullerton, Calif., assignor to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed Mar. 29, 1976, Ser. No. 671,706
Int. Cl.² G02F *1/32*
U.S. Cl. 350—161 W 2 Claims

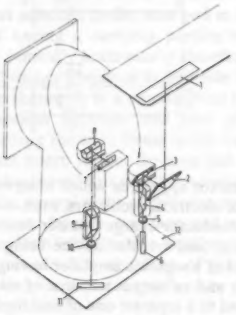


1. An acousto optical diffraction cell comprising:
a. a piezoelectric transducer, including a pair of electrodes bonded to opposite sides of said transducer;
b. a monoclinic prism bonded to said transducer in such a way, that an ultrasonic wavefront generated by said transducer propagates in a direction that makes the same acute angle with both surfaces where light enters and exits;
c. the value of said acute angle is chosen such that incoming light of different wavelengths meet said ultrasonic wavefronts at angles that are substantially equal to the Bragg angle.

4,040,723
OPTICAL APPARATUS FOR REPRODUCING A PAIR OF DATA IMAGES ON A COMMON PHOTOGRAPHIC PLANE

Abraham Groeneweg, Ridderkerk, Netherlands, assignor to N. V. Optische Industrie "De Oude Delft", Delft, Netherlands

Filed Dec. 15, 1975, Ser. No. 640,769
Claims priority, application Netherlands, Dec. 20, 1974, 7416674
Int. Cl.² G02B *17/00*; G03B *17/24*
U.S. Cl. 350—203 5 Claims

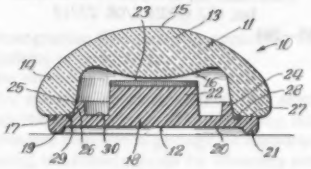


1. An optical apparatus for reproducing at least two independent data images on a common plane and adapted for use along with apparatus for producing a photographic image on that plane comprising
a first optical system for reproducing the first data image on the common plane and having an optical axis generally perpendicular to that plane,
first image rotating and inverting means in the first optical system arranged for rotation between discrete positions about the optical axis thereof,
a second optical system for reproducing the second data image on the common plane and having an optical axis generally parallel to the optical axis of the first optical system,
second image rotating and inverting means in the second optical system arrange for rotation between discrete positions about the optical axis thereof, and
a pair of interchangeable optical elements, a first of which produces an even number of reflections and a second of which produces an odd number of relections, a one of the pair of optical elements being included in each of the first and second optical systems respectively, the pair of optical elements being mounted so that they are interchangeable.

4,040,724
MAGNIFYING DISPLAY ARTICLE

Josef F. Klingler, 1335 Gregory, Wilmette, Ill. 60091

Filed Aug. 22, 1975, Ser. No. 607,029
Int. Cl.² G02B *27/02*
U.S. Cl. 350—239 13 Claims

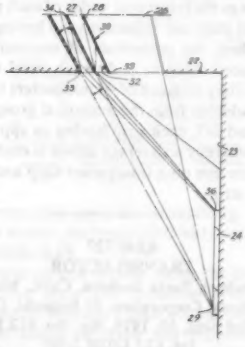


1. An article of manufacture comprising: a transparent cover defining a magnifying lens having a central vertical axis; a base having an upstanding mounting portion, an annular framing portion circumscribing said mounting portion and centering means engaging said cover for coaxially centering the mounting portion below said lens in fixed association therewith; and a display carried by and substantially fully covering said mounting portion for in-focus observation of the display through said lens, said framing portion immediately surrounding the display and being spaced below said display sufficiently to be out of focus.

4,040,725
DISPLAY ILLUMINATING STRUCTURE

Isaac Goodbar, Queens Village, N.Y., assignor to Edison Price, Inc., New York, N.Y.

Filed Jan. 22, 1976, Ser. No. 651,289
Int. Cl.² G02B *27/00*
U.S. Cl. 350—263 5 Claims



1. A display illuminating structure comprising a ceiling, a floor, a vertically extending display area disposed between said

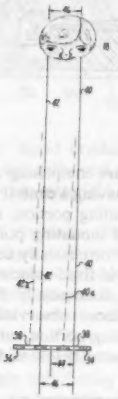
ceiling and floor and delineated by top and bottom edges, said ceiling having a light transmissive window therein with front and rear edges proximate and remote from the plane of said display area and being exposed to the exterior ambient light, the planes between the top and bottom edges of said display area and the front rear edges of said window being at angles between about 15° and 45° to the plane of said display area, and means registering with said window directing and confining the major portion of the light incident on said window to said display area, wherein the light directing means comprises a plurality of transversely spaced, laterally extending slats inclined at angles between 15° and 45° to the vertical, and said angles of inclination increase with the distance of the respective slats from the plane of the display area, and the rearwardly directed faces of said slats are of low light reflectivity.

4,040,726

SEE-THROUGH MIRROR WITH SPACED REFLECTIVE STRIPS

Francis B. Paca, 1902 Leo Lane, Alexandria, Va. 22308

Filed Mar. 12, 1976, Ser. No. 666,366
Int. Cl.[2] G02B 5/08, 27/14
U.S. Cl. 350—288 **3 Claims**



1. In an automotive vehicle, a rear view mirror located in near adjacency to the vehicle windshield for observation from the driver's seat; said rear view mirror having a light-reflective surface that is interrupted at a number of spaced points thereacross so that the mirror is subdivided into contiguous interspersed vertical reflective strips and vertical transparent strips; the transverse width of each transparent strip being approximately the same as the transverse width of each reflective strip; each transparent strip and reflective strip having an imaginary vertical centerline; the centerlines of successive transparent strips being spaced apart by a distance equal to the average driver interpupillary distance of 60 millimeters times the factor X, where X is selected from the numerical grouping consisting of 2, 2/3, 2/5 and 2/7; each strip having an appreciable recognizable width whereby an average driver is enabled to simultaneously train one eye on a transparent strip and the other eye on a reflective strip.

4,040,727

TRANSFLECTOR

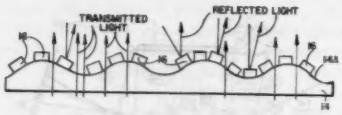
Richard D. Ketchpel, Santa Barbara, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Sept. 10, 1975, Ser. No. 612,121
Int. Cl.[2] G02B 5/08
U.S. Cl. 350—288 **9 Claims**

1. A transflector comprising,

a sheet of light transmitting material having an undulating surface, and

a discontinuous film of light reflecting material on said surface of said sheet forming a plurality of islands which exhibit a fissured pattern running in one direction across said sheet,



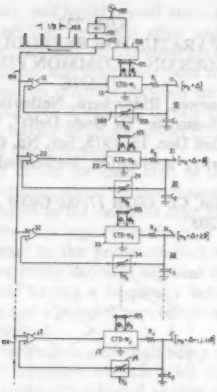
said film arranged to reflect substantial portions of incident light to prevent incident light from passing through said sheet and to permit light to be transmitted through said sheet from a light source behind said sheet.

4,040,728

ORDERED ARRAY OF INTEGRATED CIRCUIT SEMICONDUCTOR CHARGE TRANSFER DEVICE FEEDBACK DELAY TYPE OF STABILIZED PHASE-LOCKED RECURSIVE OSCILLATORS

Harold Seidel, Warren, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed July 27, 1976, Ser. No. 708,938
Int. Cl.[2] H03B 9/12
U.S. Cl. 331—55 **16 Claims**



1. Semiconductor apparatus which comprises an array of a first plurality of electrical oscillators, each oscillator including different semiconductor charge transfer device delay lines; an input terminal of said transfer device being connected to an output terminal of a separate amplifier having first and second input terminals and an output terminal of said transfer device being connected to a separate one of said feedback paths, each path going from said output terminal of the corresponding charge transfer device to the second input terminal of the amplifier; a second plurality, that is equal to or smaller than said first plurality but is greater than one-half of the first plurality, of said feedback paths including a spearate variolosser element connected in series with a separate incremental time delay element for producing an incremental time delay in the feedback path which is less than that of the corresponding charge transfer device; whereby electrical oscillations having a predetermined different sinusoidal frequency in each oscillator can be generated in response to a locking signal delivered to said first input terminal of each of said amplifiers; and further

including a different output terminal means in each of said oscillators for delivering an output signal of the corresponding oscillator in accordance with the corresponding said predetermined frequency.

4,040,729

ARTICULATED NOSE SUPPORT FOR SPECTACLE FRAME

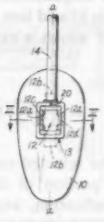
Emil Winkler, Ispringen, and Manfred Kappler, Pforzheim, both of Germany, assignors to Fa. Frey & Winkler GmbH & Co. KG, Pforzheim, Germany

Filed Apr. 28, 1975, Ser. No. 572,151

Claims priority, application Germany, Apr. 29, 1974, 7415001[U]

Int. Cl.² G02C 5/12

U.S. Cl. 351—137 **15 Claims**



1. An articulated nose support for a spectacle frame designed to be supported on the flanks of the wearer's nose by engaging them with a spaced pair of such nose supports, each nose support comprising in combination:

a stem arm extending downwardly from the spectacle frame;

a generally rectangular, substantially closed stem frame rigidly attached to the lower end of the stem arm and serving as a first pivot member;

a substantially parallel-faced nose pad which is generally oblong in contour, vertically oriented, and has a suitably curved front face for supportive contact with a wearer's nose flank;

a bracket insert attached to the nose pad in the midportion thereof and having a carrying portion extending rearwardly and generally horizontally therefrom, said carrying portion being of a contour to fit inside the stem frame, to cooperate therewith as a second pivot member; and

a pivot connection between said two pivot members, thereby attaching the stem frame to the carrying portion of the bracket insert, so that the nose pad is made pivotable about a horizontal axis which is oriented substantially parallel to the general plane of the nose pad and which is spaced a distance from its rear face; and wherein

the pivot connection includes two axially spaced male and female pivot elements in the form of journal bores and cooperating journal trunnions defined by said two pivot members, respectively;

the journal trunnions are short, generally cylindrical axial extensions of one pivot member received inside matching journal bores of the other pivot member;

at least one of the two pivot members is elastically deformable in the axial direction, so as to permit axial movement of its pivot elements during assembly; and

the journal trunnions of one pivot member and at least one outer edge of the other pivot member define together entry taper means serving as a wedge during assembly, whereby the carrying portion of the bracket insert can be snapped into the stem frame, as the deformable pivot member is forcibly deflected in the axial direction.

4,040,730

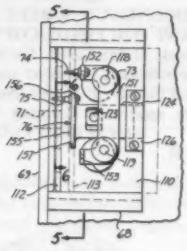
FILM ADVANCING MECHANISM WITH FILM THREADING FACILITY

Harold A. Scheib, Encino, Calif., assignor to Bell & Howell Company, Chicago, Ill.

Filed Feb. 13, 1976, Ser. No. 657,342

Int. Cl.² G03B 1/22, 27/48

U.S. Cl. 352—192 **11 Claims**



1. In photographic film handling apparatus, the improvement comprising in combination:

means for providing a film aperture; and

means for transporting photographic film relative to said film aperture, including a film advancing mechanism, a film pressure plate and a carriage for supporting said film advancing mechanism, means for releasably mounting said carriage, film advancing mechanism and film pressure plate for movement between an active position at said film aperture and a passive position spaced from said film aperture and enabling threading of film relative to said film aperture, and means for driving said film advancing mechanism in said active position for an advancement of film past said film aperture.

4,040,731

ELECTROPHOTOGRAPHIC APPARATUS HAVING A SCREEN-TYPE PHOTOCONDUCTIVE DRUM

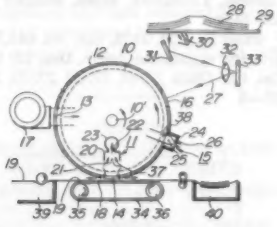
Masaji Nishikawa, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Mar. 31, 1976, Ser. No. 672,444

Claims priority, application Japan, Apr. 4, 1975, 50-41080; Apr. 5, 1975, 50-40819

Int. Cl.² G03G 15/02, 15/22

U.S. Cl. 355—3 R **4 Claims**



1. An electrographic apparatus comprising:

a drum type screen photosensitive body rotatably mounted on a rotatable shaft,

a corona charge device located along the periphery of said photosensitive body and including a corona discharge wire connected through a high voltage source to ground, a grounded shield electrode and a grounded field electrode, said photosensitive body being interposed between said corona discharge wire and said shield electrode,

a substantially hermetically sealed cylindrical cover for

surrounding said photosensitive body and having at its periphery an air inlet opening and an ion outlet opening opposite to said corona discharge wire, and

a fan opposite to said air inlet opening, whereby air under pressure is introduced through said air inlet opening into said cylindrical cover and discharged therefrom through said ion outlet opening.

4,040,732

PHOTOCONDUCTOR BELT AND DRUM ARRANGEMENT FOR PHOTOCOPYING APPARATUS

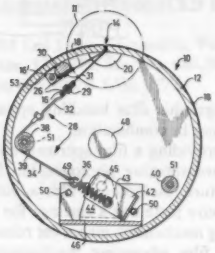
Wolfgang Hummel, Mainz-Kastel, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Feb. 27, 1976, Ser. No. 662,275

Claims priority, application Germany, Mar. 3, 1975, 2509117

Int. Cl.[2] G03G *15/00*

U.S. Cl. 355—3 R **15 Claims**



1. An electrophotographic copying apparatus comprising a cylindrical drum member having a circumferential wall and an aperture in said circumferential wall, and a photoconductor belt having first and second end sections, said belt covering the outer face of said wall, said belt passing through said aperture having a width of between 2 and 3 times the thickness of said belt and extending into the inner space defined by said circumferential wall to form a seal for said aperture by pressing together under tension against the face of said aperture, said end sections being secured in said inner space, the first of said sections being attached to a means for maintaining tension in said belt and the second of said end sections being attached to a fixed member within said drum.

4,040,733

VARIABLE MAGNIFICATION SLITWISE EXPOSURE PROCESS AND APPARATUS THEREFOR FOR USE WITH ELECTROPHOTOGRAPHIC COPYING MACHINE

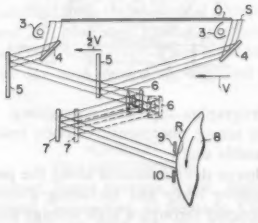
Toyokazu Satomi, Yokohama, Japan, assignor to Ricoh Company, Ltd., Japan

Filed Dec. 23, 1975, Ser. No. 643,794

Claims priority, application Japan, Dec. 25, 1974, 50-3815

Int. Cl.[2] G03B *27/48, 27/50, 27/70, 27/32*

U.S. Cl. 355—8 **16 Claims**



1. A variable magnification slitwise exposure apparatus, for use with electrophotographic copying machines of the type in which a photosensitive surface is moved at a constant speed in a direction along a predetermined path having an exposure range therein at a fixed position while an original is scanned progressively by relative movement between the original and a source of light, said apparatus comprising: (a) holding means for supporting an original to be copied with its leading edge, considered in the scanning direction, always at a fixed position on the holding means irrespective of the magnification selected, (b) means operable to slitwise scan, at a constant rate which is adjusted dependent upon the magnification selected, an image of the original on said holding means, in order to transmit the original image onto said photosensitive surface, moving at said constant speed, at said fixed exposure range, (c) lens means having an optical axis and operable to focus the original image onto said photosensitive surface at said fixed exposure range, (d) means operable to adjust a first optical distance, between the original and said lens means, and a second optical distance, between said lens means and said photosensitive surface, in accordance with the magnification selected, (e) means operable to adjust said lens means, in accordance with the selected magnification, in a direction perpendicular to the optical axis of said lens means at a magnification of unity, by a distance y which is expressed by the following equation:

$$y = \frac{1-\beta}{1+\beta} h$$

wherein β represents the selected magnification and h represents the height of a portion of the original image being scanned at unity magnification, and (f) means maintaining constant the quantity of light incident on a unit of area of said photosensitive surface through said lens means at any magnification for a given original image.

4,040,734

CRUST FORMER

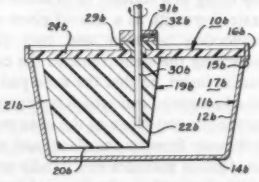
Luther Ellis Glasgow, 2122 Lakeshore Ave., Oakland, Calif. 94606

Continuation-in-part of Ser. No. 361,654, May 18, 1973, Pat. No. 3,902,837. This application Aug. 28, 1975, Ser. No. 608,641

The portion of the term of this patent subsequent to Sept. 2, 1992, has been disclaimed.

Int. Cl.[2] A47J *43/00*

U.S. Cl. 425—218 **34 Claims**



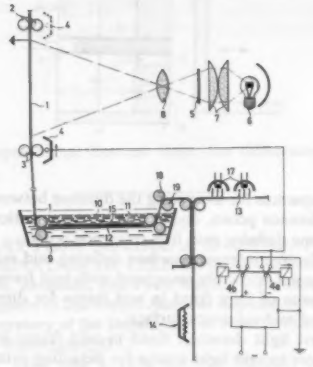
32. In a device for spreading material to form a crust in a container having a bottom wall and a peripheral side wall: a forming head having a bottom wall, a side wall and a wall extending between the bottom and side walls of the forming head to provide a radially extending surface for spreading crust material upon rotation of the forming head about the center of the container; support structure engageable with the container and having means to constrain the support structure against rotation relative to the container; and means rotatively mounting the forming head to the support structure for rotation about the center of the container with the bottom and side walls of the forming head facing the corresponding walls of the container.

4,040,735

APPARATUS FOR MICROFILM RE-ENLARGEMENT

Detlef Winkelmann, Wiesbaden-Biebrich; Bernd Löhr, and Helmut Stieger, both of Wiesbaden, all of Germany, assignors to Hoechst Aktiengesellschaft, Germany

Continuation of Ser. No. 423,721, Dec. 11, 1973, abandoned, which is a division of Ser. No. 319,198, Dec. 29, 1972. This application Sept. 24, 1975, Ser. No. 616,476
Claims priority, application Germany, Dec. 31, 1971, 2165901
Int. Cl.[2] G03G *15/02*
U.S. Cl. 355—10 2 Claims



1. An apparatus for the re-enlargement of a positive or negative microfilm original comprising

charging means for the uniform charging negatively or positively respectively of a photoconductor which includes a high potential device with means for reversing the sign of the high potential for discharge elements providing the charge,

exposure means for projecting an enlarged image of a microfilm original onto said charged photoconductor,

developer means for applying one and the same developer onto said photoconductor, said developer means including a trough adapted to contain a liquid developer including particles having one polarity only, a developing electrode mounted in an insulated manner and having numerous uniformly distributed perforations, the electrode being located a short distance from the photoconductor in a developer bath and adapted to form a capacitor together with an aluminum vapor-coated conductive backside of the photoconductor when said photoconductor is arranged between both capacitor plates,

transfer means for transferring a developed charge image onto a copy support,

and means for moving the photoconductor through the apparatus.

4,040,736

STEP-AND-REPEAT PROJECTION ALIGNMENT AND EXPOSURE SYSTEM

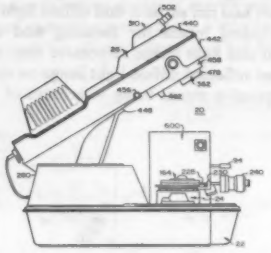
Karl-Heinz Johannsmeier, Mountain View, Calif., assignor to Kasper Instruments, Inc., Mountain View, Calif.

Division of Ser. No. 396,413, Sept. 12, 1973, Pat. No. 3,940,211, which is a continuation of Ser. No. 126,769, March 22, 1971, abandoned. This application Nov. 4, 1975, Ser. No. 628,793
Int. Cl.[2] G03B *27/42*
U.S. Cl. 355—43 37 Claims

1. Alignment apparatus comprising:

a workpiece holder for holding a workpiece, said workpiece holder being mounted for translational movement only along an optical axis of the workpiece;

a mask holder for holding a mask, said mask holder being mounted for translational movement along at least two orthogonal axes orthogonally intersecting an optical axis of the mask holder to permit alignment of the mask with a selected region of the workpiece; and



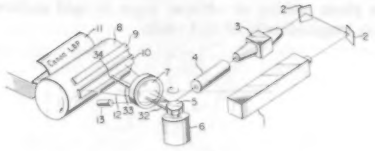
means mounted adjacent to the workpiece holder for selectively moving the workpiece to different positions thereon to permit alignment of different regions of the workpiece with the same mask.

4,040,737

METHOD AND ARRANGEMENT FOR ELIMINATING GHOST IMAGE

Katsumi Masaki, Kodaira; Kazuhiro Hirayama, Yokohama; Yasushi Sato, Kawasaki, and Yoichi Hirabayashi, Machida, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 25, 1975, Ser. No. 616,629
Claims priority, application Japan, Jan. 28, 1975, 50-11532
Int. Cl.[2] G03B *27/48, 27/50, 27/70*
U.S. Cl. 355—49 17 Claims



17. An apparatus for eliminating a ghost image in an image handling apparatus comprising:

means for reflecting a light beam, having at least two non-parallel reflecting surfaces and movable about a fixed shaft;

light beam receiving means having a surface to be scanned by the light beam reflected by said reflecting means; and

means for displacing any light reflected by said light receiving means and re-reflected by said reflecting means away from the scanning line formed by said reflected light beam.

4,040,738

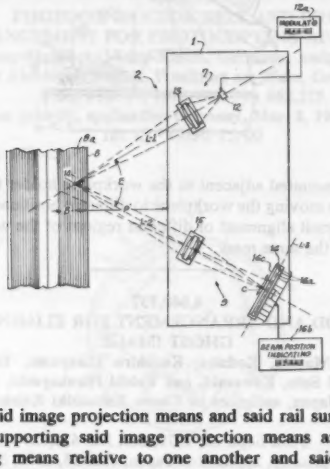
RAILROAD TRACK PROFILE SPACING AND ALIGNMENT APPARATUS

Herbert A. Wagner, Corona Del Mar, Calif., assignor to Gulton Industries, Inc., Metuchen, N.J.

Filed Mar. 20, 1975, Ser. No. 560,539
Int. Cl.[2] G01C *3/00;* E01B *29/04*
U.S. Cl. 356—1 18 Claims

1. In combination with a track rail with an upper section having a top and side surface on which the wheel of a railroad car rolls, a railroad car mounted for rolling movement on said track rails, the improvement in range sensor apparatus mounted on said railroad car for measuring the distance between a given point on said railroad car and said rail, said apparatus comprising: image projecton means for focusing the image of a light source on said side surface of said rail, re-

flected light image responsive means upon which the reflected diffuse light image is to be directed, and eflected diffuse light image receiving means for receiving the diffuse image reflected from said rail surface, said diffuse light image receiving means including means for focusing said reflected diffuse image onto said light image responsive means, the position of the focussed reflected diffuse light image on said reflected light image responsive means being a measure of the distance be-



tween said image projection means and said rail surface, and means supporting said image projection means and image receiving means relative to one another and said surface wherein the axis along which said image is focussed on said rail surface and the axis along which said image receiving means receives a focussed diffuse reflected image for said rail surface are in a plane making an oblique angle to said surface and extending longitudinally of said track. .

4,040,739

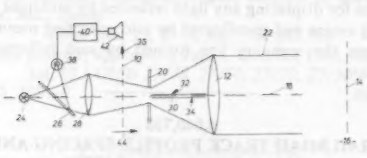
METHOD AND DEVICE FOR GENERATING A SIGNAL DEPENDENT ON THE DISTANCE OF AN OBJECT IN AN OBJECT SPACE

Wolfgang W. Witte, Burgbergring 9, 777 Uberlingen, Germany

Filed Mar. 15, 1976, Ser. No. 666,880

Int. Cl.² G01C *3/08*

U.S. Cl. 356—4 **24 Claims**



1. A method for generating a signal dependent on the distance of an object in an object space, comprising the steps of

a. forming in said object space a real first pattern image having area portions of different optical characteristics;

b. optically imaging said first pattern image as a second pattern image backwards on a physical pattern similar to said second pattern image;

c. generating relative movement between said second pattern image and said physical pattern; and

d. determining the variation of the radiation flux, from said object space and through said physical pattern, caused by said relative movement and producing a signal based on that determination.

4,040,740

OPTO-ELECTRONIC SENSOR

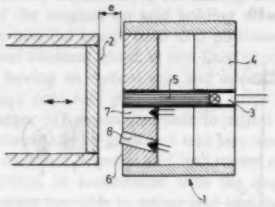
Dieter Handtmann, Sindelfingen, Germany, and Jean-Pierre Lavanchy, Neuchatel, Switzerland, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed May 30, 1975, Ser. No. 582,137

Claims priority, application Germany, July 2, 1974, 2431630

Int. Cl.² G01C *3/08*

U.S. Cl. 356—4 **9 Claims**



1. An apparatus for measuring the distance between first and second reference points, comprising; in combination:

A. a frame defining said first reference point;

B. a reflective reference surface defining said second reference point, movably associated with said frame;

C. a source of light fixed in said frame for directing light toward said reference surface;

D. a first light detector, fixed in said frame immediately adjacent to said light source for detecting primarily light which is retro-reflected from said reference surface and generating a first detector signal;

E. a second light detector, fixed in said frame at a lateral distance from said light source and from said first light detector, for detecting primarily light which has been angularly reflected by said reference surface and for generating a control signal;

F. circuit means, connected to said second light detector and to said source of light for so controlling the intensity of light provided by said source of light that said control signal from said secondary control detector remains substantially constant;

whereby the magnitude of said first signal is independent of change in the coefficient of reflectance of said reflecting surface.

4,040,741

POLARIZED GRATING OPTICAL ODOMETER

David William Swift, Prestatyn, Wales, assignor to Perkin-Elmer Limited, Bucks, England

Continuation of Ser. No. 441,469, Feb. 11, 1974. This application June 18, 1976, Ser. No. 697,489

Claims priority, application United Kingdom, Feb. 14, 1973, 7125/73

Int. Cl.² G01P *3/36*

U.S. Cl. 356—28 **14 Claims**

1. Apparatus for measuring displacement of velocity relative to a surface characterized by non-uniform luminous intensity with respect to which said apparatus is independently supported at a distance, said apparatus comprising:

grating means, having bands of two different optically selected characteristics arrayed transversely of the path of displacement and in alternating sequence, for rendering light from said surface which is incident on the bands having one characteristic optically distinguishable from that incident on the bands of the other characteristic;

means including optically selective filter means for separating light from the bands having said one characteristic from the light coming from the bands of said other characteristic, thereby to provide from the light from the respective bands separate light signals representative of luminous intensity variations of such a surface; and

means for comparing said separate light signals to produce

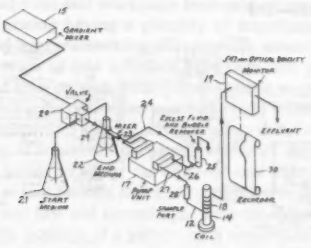
an output signal derived from the difference therebetween.

4,040,742

CAPILLARY FLOW METHOD AND APPARATUS FOR DETERMINATION OF CELL OSMOTIC FRAGILITY

Yoichiro Ito, Bethesda, and Peter Carmeci, Potomac, both of Md., assignors to The United States of America as represented by the Secretary of the Department of Health, Education and Welfare, Washington, D.C.

Filed Aug. 9, 1976, Ser. No. 713,045
Int. Cl.[2] G01N *33/16, 21/26*
U.S. Cl. 356—39 13 Claims



1. A method for determining cell osmotic fragility of a cell-containing sample comprising passing a salt solution through a capillary tube with substantially horizontal portions and wherein the flow follows Poiseuille's parabolic flow pattern, changing the osmotic gradient of the salt solution with time as it is passed through the capillary tube, inserting the sample in the tube so that it reaches said substantially horizontal portions, whereby the salt solution flows faster than the cells of the sample at said substantially horizontal portions and whereby the cells are exposed to salt solution of changing osmolarity, and continuously plotting the variation of optical density with time of the effluent from the capillary tube.

4,040,743

METHOD AND APPARATUS FOR MEASURING THE BRIGHTNESS OF PULP SLURRY

Henry F. Villaume, Intervale, N.H.; D. Stephen Collins, Bridgton, Maine, and Patrick J. Peoples, Intervale, N.H., assignors to Howell Laboratories, Incorporated, Bridgton, Maine

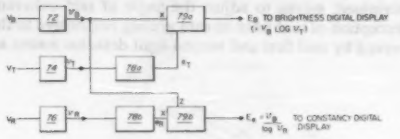
Filed Sept. 22, 1975, Ser. No. 615,584
Int. Cl.[2] G01N *21/00, 21/26*
U.S. Cl. 356—73 31 Claims

1. A brightness meter which comprises:

a. means to introduce a beam of energy into a pulp slurry to measure a property of the slurry, which property is dependent upon at least two variables and which energy is back-scattered in a first direction, reflected in a second direction, and transmitted in a third direction;

b. means to receive the back-scattered energy and to select the transmitted energy and to provide a selected signal;

c. means to convert the selected signal to a log function;



d. means to multiply the signal corresponding to the back-scattered energy with the selected signal, whereby one of the variables is eliminated in making the measurement of the desired property of the pulp slurry; and,

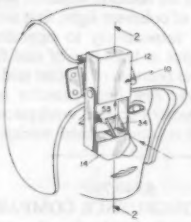
e. means to display and processed measurement.

4,040,744

MULTIPLE SPECTRUM CO-AXIAL OPTICAL SIGHT AND CLOSED LOOP GUN CONTROL SYSTEM

Charles W. Schertz, and Edward H. Ritter, both of Claremont, Calif., assignors to General Dynamics

Filed Oct. 5, 1973, Ser. No. 404,077
Int. Cl.[2] G01B *11/26*
U.S. Cl. 356—152 6 Claims



1. A sight system for use in closed-loop gun control systems comprising:

a plurality of detector means for detecting radiant energy at selected and different optical energy wave lengths;

at least one of said detector means including a multiple element detector means for producing a signal indicative of the angular displacement and orientation of incident optical radiant energy;

display means for converting processed signals from said multiple element detector means into a visual signal; and

optical means for superimposing the visual signals from said display means into the visual sight line.

4,040,745

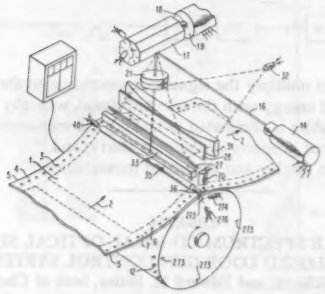
INSPECTION TOOL

James Garman Belleson, Hillsborough, Calif., and Kendall Clark, Poughkeepsie, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 592,154, June 30, 1975. This application Mar. 25, 1976, Ser. No. 670,489
Int. Cl.[2] G02B *27/17*
U.S. Cl. 356—167 21 Claims

1. An inspection tool comprising: means to position a workpiece in a work zone, said workpiece having a pattern to be inspected; a source of coherent light and means to effect a sweep of said coherent light across said work zone; first light detector means positioned adjacent said work zone to receive

light reflected from said workpiece from a sweep of coherent light; a grating having a plurality of interdigitated light receiving and light transmitting lines thereon; means to reflect at least a portion of said coherent light onto said grating to intercept said lines on said grating at an oblique angle; second light detector means positioned to receive light transmitted by said light transmitting lines of said grating so that the position of said sweep of coherent light across said work zone may be determined; means to adjust the angle of said coherent light interception of said lines on said grating responsive to the light received by said first and second light detector means as compared with the position of a pattern on a nominal workpiece; means to provide relative movement between said workpiece and said sweep of coherent light across said work zone in a path substantially perpendicular to said sweep; an elongated flexible prism mounted for rotation adjacent said work zone in the path of said sweep of coherent light; first and second actuator means connected respectively to opposite ends of said prism; means to energize at least one of said first and second actuator means to effect rotation of at least said one end of said flexible prism upon said first light detector means detecting misalignment of said pattern on said workpiece relative to the position of the pattern on said nominal workpiece.

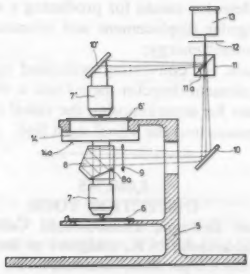


4,040,746

OPTICAL CONGRUENCE COMPARATOR

Christian Lietar, Morges, Switzerland, assignor to Robert Bosch GmbH, Stuttgart, Germany

Filed July 21, 1976, Ser. No. 707,322
Claims priority, application Germany, Aug. 21, 1975, 2537153
Int. Cl.[2] G02B *21/18*
U.S. Cl. 356—168 **7 Claims**



1. Optical congruence comparator to compare the outlined dimensions, in respective image planes of two objects (**6, 6'**) comprising

a slide carrier (**5**) supporting said objects (**6, 6'**) in superposed alignment with respect to a line perpendicular to said planes;

a microscope optic (**7–10; 7'–10', 10''; 11–13**) forming superposed images of said respective objects and including two objective channels (**7, 7'**) having objective planes parallel to said imaging planes,

wherein the focal length of the microscope objective in one channel (**7**) is equal to one-half the distance (H) of separation of corresponding elemental area (A, A'), zones or points of the objects to be compared and the microscope optic generates an image of the areas, zones or points to be compared at, or close to essentially infinity; and

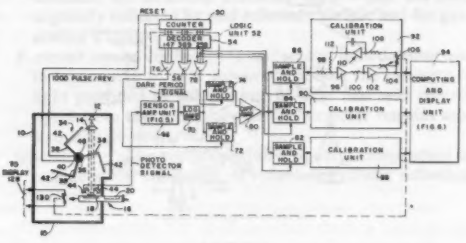
a plane mirror (**14**) fixedly connected to said carrier (**5**) and having a mirror plane (**14*a***) which extends parallel to said imaging planes so that small rotary distortion of the carrier will not interfere with congruence of corresponding elemental areas, zones or points of the respective objects (**6, 6'**) in the superposed microscope images.

4,040,747

OPTICAL ANALYZER FOR AGRICULTURAL PRODUCTS

Donald R. Webster, Laurel, Md., assignor to Neotec Corporation, Silver Spring, Md.

Continuation of Ser. No. 283,270, Aug. 24, 1972, abandoned.
This application Aug. 15, 1974, Ser. No. 497,727
Int. Cl.[2] G01J *3/48*; G01N *21/48*
U.S. Cl. 356—188 **13 Claims**

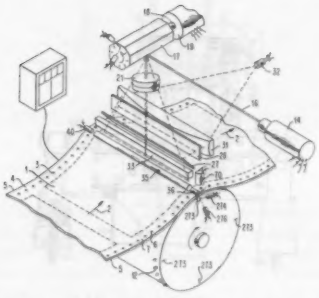


1. Optical measuring apparatus, comprising means for illuminating an object with a plurality of wavelengths of light in a continuous sequence, light sensitive means operatively positioned to produce an output indicative of the level of light received from said object, logic means responsive to said continuous sequence for producing a plurality of outputs indicative of illumination of said object by certain wavelengths of light, logarithmic amplifier means operatively receiving the output of said light sensitive means, a pair of sample and hold circuits operatively connected to receive the output of said logarithmic amplifier means and connected respectively for selective control by said logic means, differential amplifier means operatively connected to receive the outputs of said pair of sample and hold circuits to produce an output indicative of ΔOD, wherein ΔOD represents the difference in optical density at a pair of different wavelengths, a plurality of additional sample and hold circuits operatively connected to receive the output of said differential amplifier and respectively connected for selective control by said logic means to store separate outputs indicative of ΔOD at different pairs of wavelengths, and computer means operatively receiving the outputs of said additional sample and hold circuits for computing the value of mathematical function of the outputs of said additional sample and hold circuits.

4,040,748
INSPECTION TOOL

James Garman Belleson, Hillsborough, Calif., and Kendall Clark, Poughkeepsie, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 592,154, June 30, 1975. This application Mar. 25, 1976, Ser. No. 670,488
Int. Cl.[2] G02B *27/17*
U.S. Cl. 356—199 13 Claims



1. An inspection tool comprising: means to position a workpiece in a work zone, said workpiece having a pattern to be inspected; a source of coherent light and means to effect a sweep of said coherent light across said work zone; first light detector means positioned adjacent said work zone to receive light reflected from said workpiece from said sweep of coherent light; a grating having a plurality of interdigitated light receiving and light transmitting lines thereon; means to reflect at least a portion of said coherent light onto said grating to intercept said lines on said grating at an oblique angle; second light detector means positioned to receive light transmitted by said light transmitting lines of said grating so that the position of said sweep of coherent light across said work zone may be determined; means to adjust the angle of said coherent light interception of said lines on said grating responsive to the light received by said first and second light detector means as compared with the position of a pattern on a nominal workpiece; means to provide relative movement between said workpiece and said sweep of coherent light across said work zone in a path substantially perpendicular to said sweep of coherent light; and means interconnecting the means to provide relative movement and said means to effect said sweep for synchronizing said sweep of coherent light to said relative movement of a workpiece in said path.

4,040,749
ORGANIC VAPOR DETECTION WITH LIQUID CRYSTALS

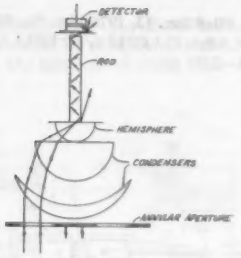
Donald J. David, Centerville, and Edgar E. Hardy, Kettering, both of Ohio, assignors to Monsanto Research Corporation, St. Louis, Mo.

Continuation of Ser. No. 547,311, Feb. 5, 1975, abandoned. This application July 16, 1976, Ser. No. 705,962
Int. Cl.[2] G01N *21/22, 21/48*
U.S. Cl. 356—201 4 Claims

1. A device for detecting organic vapors comprising

a. an elongated waveguide having on the surface thereof a sufficient amount of liquid crystal material sensitive to organic vapor to measurably change the light transmitting capability of said waveguide upon contacting said waveguide with said vapor.

b. a light source positioned to transmit light lengthwise through said waveguide, and

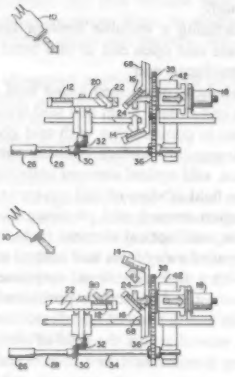


c. means for measuring the light exiting from said waveguide.

4,040,750
REAL TIME REFLECTOMETER

James M. Zwiener, Madison, Ala., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed May 28, 1976, Ser. No. 691,256
Int. Cl.[2] G01N *21/48*
U.S. Cl. 356—212 7 Claims



1. A reflectometer comprising:

radiation source;

fixed detector for determining reflectance;

rotating sample wheel containing an aperture and a sample cell, said sample wheel disposed in the optical path of said radiation source;

rotating optical wheel having an axis of rotation transverse to the axis of rotation of said sample wheel, said optical wheel means disposed in the optical path of said radiation source;

mirror means mounted upon said optical wheel for receiving radiation reflected from said sample cell and directing said reflected radiation into said detector, and for receiving radiation passing through said aperture and directing said unreflected radiation into said detector;

drive motor; and

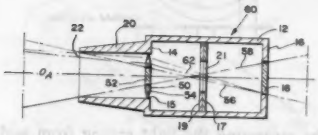
drive means connected to said motor, said sample wheel and said optical wheel for simultaneously rotating both said sample wheel and said optical wheel.

4,040,751

UNICELL PHOTOMETER DEVICE

Philip G. Baker, Peabody, and Bruce K. Johnson, Andover, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Jan. 13, 1976, Ser. No. 648,651
Int. Cl.[2] G01J 1/42; H01J 3/14
U.S. Cl. 356—225 10 Claims



1. A radiation measuring device comprising;

a photoelectric transducer having a central axis and a photosensitive surface of given dimensions substantially perpendicular to said central axis;

an antiflare bezel extending around said axis in front of said transducer and having an open end for admitting radiation therethrough;

means for defining a variable limiting aperture positioned intermediate said open end of said bezel and said photoelectric transducer; and

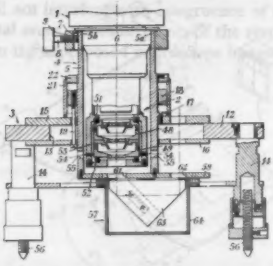
an optical element positioned along said axis intermediate said open end of said bezel and said transducer, said optical element in combination with said given dimensions of said photosensitive surface defining the field of view of said device, said optical element collecting radiation from within the field of view of said device to selectively direct said radiation toward said photosensitive surface of said transducer, said optical element including a first portion radially spaced away from said central axis to provide said device with a first directional response pattern to a discrete constant energy source positioned a given distance away from and in front of said device such that when said source is moved across the field of view of said device at said given distance said first directional response pattern includes a peak on-axis response which exponentially decreases as a function of the angular field position of said source such that said response equals zero when the source is outside of the field of view of said device and a second portion extending radially outward from said central axis to meet said first portion of said optical element to provide said device with a second directional response pattern to the source having a peak on-axis response lower than that of said first directional response pattern and which exponentially decreases as a function of the angular field position of said source at a lower rate than the exponential decrease of said first directional response pattern so that said first and second directional response patterns, when combined, provide said device with a preferred directional response pattern to the source which includes a peak on-axis response less than the peak on-axis response of said first directional response pattern but which exponentially decreases at a rate intermediate the rates of decrease of said first and said second directional response patterns.

4,040,752

LASER UNIT WITH A LASER BEAM AUTOMATICALLY ALIGNED TO THE VERTICAL DIRECTION

Luc André Tagnon, Saint Mande, France, assignor to Essilor International (Compagnie Générale d'Optique), Joinville Le-Pont, France

Filed Mar. 28, 1975, Ser. No. 562,891
Claims priority, application France, Apr. 24, 1974, 74.14229
Int. Cl.[2] G01C 9/18
U.S. Cl. 356—249 12 Claims



1. A laser unit for directing a laser beam in a strictly vertical direction which comprises a laser proper, an afocal system, a base structure having means for supporting said laser and afocal system in a position such that said laser has its axis disposed in a substantially vertical position, an optical device for automatically correcting the verticality of the laser beam emitted from said laser, said optical device being located after said afocal system on the substantially vertical path of said laser beam and comprising a pair of coaxially superposed cups containing a liquid having an index of refraction of 1.5, the bottom of each one of said cups consisting at least partly of a parallel-faced transparent blade, said blades being parallel to each other, said support means comprising means allowing the assembly of said laser, focal system and automatic correction device to rotate about the substantially vertical axis of said laser beam, said cups being housed in a cylindrical case having coaxial top and bottom aperture permitting the passage of the laser beam, said case being secured coaxially to said laser, and adjustment means adapted to be actuated from the outside of said case for adjusting the orthogonality of said parallel-faced transparent blades of said pair of cups with respect to the incident laser beam.

4,040,753

APPLICATOR INSTRUMENT

Vernon D. Griffith, Wichita, Kans., assignor to Griffith, Inc., Wichita, Kans.

Filed July 15, 1976, Ser. No. 705,409
Int. Cl.[2] B43M 11/06
U.S. Cl. 401—186 10 Claims

1. A liquid applicator instrument comprising:

a compressible hollow body adapted to contain said liquid and having an open end;

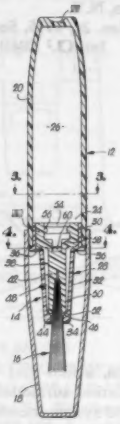
a nozzle assembly mounted in the open end of the body and including a stem element and a ferrule element, said ferrule element having a base retained within the open end of the hollow body, and a tip extending outwardly from the base;

liquid passage means through the nozzle, said passage means being open when said elements are in one relative position and closed when said elements are in another relative position; and

brush means mounted in the nozzle assembly and disposed to receive liquid from the passage means when the latter is open,

said ferrule element including a flexible wall interconnecting the base and the tip of said ferrule, whereby said tip may

be shifted to said one relative position with respect to said stem upon compression of said hollow body to open said



passage and to said other relative position upon release of such compression to close said passage

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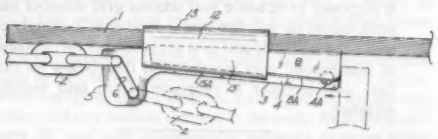
4,040,754

CABLE ATTACHMENT

Elvin O. Burroughs, 81650 Lost Creek Road, Dexter, Oreg. 97431

Filed Feb. 26, 1976, Ser. No. 661,747
Int. Cl.² F16G *11/04*
U.S. Cl. 403—16 **1 Claim**



1. A cable attachment adapted for wedged engagement with a segment of tensioned cable, said attachment comprising,

a main body member for lengthwise abutment against said cable segment, said body member having a lengthwise orientated base and a pair of surfaces offset from and inclined relative to the axis of said cable segment, an enlarged head portion at one end of said base and at the lower end of the incline defining an elongate opening inclined to the cable axis within which a tensionable member is retained,

a secondary member adapted for engagement with said main member and having lengthwise orientated surfaces for coaction with the pair of inclined surfaces on said main body whereby relative movement between said members will draw said members toward one another and into gripping engagement with said cable segment, and

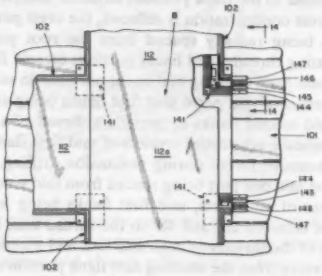
said main body member and secondary member adapted for disengagement by sudden impacting of the tensionable member against that part of the head portion defining the outer end of said elongate opening.

4,040,755

TRENCH DUCT CONNECTOR

George N. Jorgensen; Frank D. King, and DeForest D. Butler, all of Oxford, Ohio, assignors to Square D Company, Park Ridge, Ill.

Continuation of Ser. No. 545,109, Jan. 29, 1975, abandoned. This application Feb. 20, 1976, Ser. No. 660,202
Int. Cl.² E04F *17/08*; F16B *9/02*
U.S. Cl. 403—205 **8 Claims**



1. A connector for use as an inside connector in one position and as an outside corner in an inverted position in a trench duct system of a type including spaced apart elongated generally parallel side rails and removable cover plates spanning the distance between the side rails to engage correlative surfaces of the side rails, said connector comprising:

two angularly disposed leg segments forming a first generally planar surface and a second generally planar surface on a side opposite the first surface with both surfaces adapted to engage a cover plate, an acute-angle side surface and an obtuse angle side surface, and two distal end surfaces;

a first rib-like elongated portion located on and protruding above the first surface, extending alongside the acute angle side, and having a top surface generally parallel to the upper surface and raised above the first surface a height selected to form a surface coplanar with the cover plates when assembled;

a second rib-like elongated portion located on and protruding above the second surface, extending alongside the obtuse angle side, and having a surface generally parallel to the second surface and raised above the second surface a height selected to form a surface coplanar with the cover plates when assembled; and

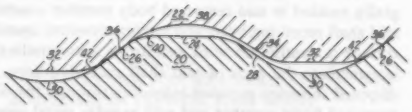
a means for fastening the connector to adjoining side rails of the trench duct sections.

4,040,756

DRILL ROD THREAD FORM

Edward Alfred Donegan, St. Catharines, Canada, assignor to TRW Canada Limited, Canada

Filed Mar. 5, 1976, Ser. No. 664,259
Int. Cl.² F16B *7/00*
U.S. Cl. 403—307 **4 Claims**



1. Apparatus for use in percussion drilling for transmitting rotary and downwardly directed percussive forces to a drill bit, said apparatus comprising a first part and a second part, said first part having a cylindrical internal thread structure which cooperates with a cylindrical external thread structure

on said second part, said thread structures on said first part and said second part being formed about a thread axis and constructed to minimize unlocking torque, the threads on said parts each having first and second axially spaced flanks, said first flanks each having a linear portion, said threads on each of said parts also having a crest portion extending between the outer edges of said first and second flanks and a root portion for interconnecting adjacent threads, said root portions of at least said second part being continuously curved and tangentially joined to the flank portions adjacent therewith such that local stress concentration is reduced, the crest portions of said threads being radially spaced from the root portion of the cooperating threads, said linear portions on said first flanks on one of said parts abutting said linear portions on said first flanks on the other of said parts, said first flanks being axially spaced from said second flanks to provide a thread of a thickness to accommodate substantial erosion of said first flanks by rotary and percussive forces during percussion drilling, said second flanks on said one part being spaced from said second flanks on the other of said parts, said first flanks being inclined at an angle of between 25° and 40° to the thread axis, and the crest portion of the threads of both said first and second parts being angled away from the abutting first flank portion of that thread toward the root portion of that thread to form a peak portion of the crest adjacent the abutting first flank portion such that after substantial wear of the abutting flank the crest portion of that thread remains out of substantial contact with the cooperating thread.

4,040,757

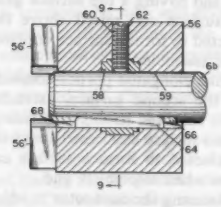
DRIVE COUPLING

Ernest H. Pauli, Watchung, N.J., assignor to The Hilliard Corporation, Elmira, N.Y.

Continuation-in-part of Ser. No. 286,346, Sept. 5, 1972, Pat. No. 3,884,049. This application Mar. 12, 1975, Ser. No. 557,826

Int. Cl.[2] F16B *3/00*

U.S. Cl. 403—356 **2 Claims**



1. A universal drive coupling element adapted to be mounted on a first, rotatable shaft to form a drive connection with a second shaft comprising, a cylindrical molded plastic member, a plurality of symmetrically disposed axially projecting forward end portions operable to form a slideable, torque transmitting, engagement with a similar coupling element oppositely disposed on a second shaft, a rearwardly extending cylindrical body member, an axially disposed bore extending inwardly from the rearward end of said member to slideably receive said first shaft therein, an annular metal member integrally molded in said rearward body member concentric with said shaft receiving bore, and having a central opening whose surface is contiguous with and forms a longitudinal segment intermediate the ends of said shaft receiving bore, a radially disposed threaded member extending through the wall of said rearward body member and said annular metal insert threadedly engaged with said metal insert and engagable with (a) the shaft in said bore, said first shaft contains a longitudinal key slot and having a projecting locking member in lateral engagement with said annular member that projects into said key slot to resist relative rotation of said coupling member and said first shaft.

4,040,758

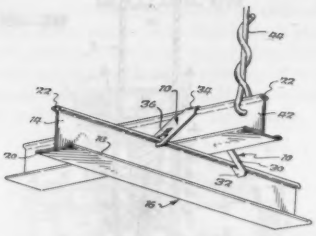
SUSPENDED CEILING HANGING CLIP

Gale E. Sauer, Williamsville, N.Y., assignor to Roblin Industries, Inc., Buffalo, N.Y.

Filed Jan. 24, 1975, Ser. No. 543,920

Int. Cl.[2] E04B *5/52*

U.S. Cl. 403—397 **7 Claims**



1. In combination, a first grid system member having an upstanding web portion surmounted by a longitudinal bead means, a second grid system member disposed above said first grid member, and a hanger clip for supporting said first grid member from said second grid member, said hanger clip comprising:

a first end, said first end having a substantially planar web means and a tongue means protruding outwardly from said web means wherein said tongue means is substantially perpendicular to the plane of said web means, is transversely centered thereon and includes a reduced neck portion adjacent to said web means for connection thereto, said first end further including hook means adapted for locking engagement with said bead means of said first grid member and

a second end, said second end being integrally connected to said first end and having hook means adapted for locking engagement with said first grid member, said hook means comprising a pair of bifurcated, snap acting legs disposed on the portion of said second end most distal from said first end for snap locking engagement on said longitudinal bead means of said first grid system member, said clip further including a flexible connective portion between said ends thereof wherein said flexible connective portion is disposed to straddle said second grid member and said hook means on said first and second ends lockingly engage said bead means of said first grid member on opposite sides of said second grid member and therebelow so that said first grid member is supported from said second grid member.

4,040,759

WARNING, MARKING AND/OR BARRIER ARRANGEMENT

Olaf Narten Skalle, Vollebergvn. 32, 1620 Gressvik, Norway

Filed Sept. 1, 1976, Ser. No. 719,448

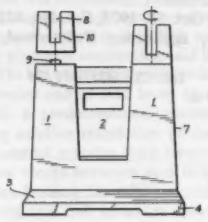
Claims priority, application Norway, Sept. 3, 1975, 753024; Aug. 4, 1976, 762701

Int. Cl.[2] E01F *15/00*

U.S. Cl. 404—6 **12 Claims**

1. A warning, marking and/or barrier arrangement with trestle barriers, barrier planks, and mountings for signboards combinable into units for warning, marking and/or barring purposes, and comprising: a trestle barrier of plastic material and shape of a hollow double pyramid having a hollow connecting web; a hollow support for mounting said pyramid and web; the top of each pyramid having grooves extending in two normal directions; barrier planks having securing elements at their end portions; mounting means for placement of signboard means; said mounting means being in lowermost portions adapted to said grooves, said mounting means having lugs in

center portions and having a hole in uppermost portions; a slide bar secured to said hole, said slide bar having a slot and



having an upper edge shaped to engage over the edge of a sign board.

4,040,760

DIRECTION-INDICATING SURFACE MARKING APPARATUS FOR ROADWAYS AND THE LIKE

Charles W. Wyckoff, 85 Pine St., Needham, Mass. 02192

Continuation of Ser. No. 478,453, June 12, 1974, abandoned. This application Jan. 15, 1976, Ser. No. 649,267

Int. Cl.[2] E01F *9/08*

U.S. Cl. 404—14 **14 Claims**

1. In combination with a roadway surface, a direction-indicating surface marker apparatus comprising a thin, elongated strip of substantially continuous solid-surface planar plastic material pre-formed separately from said roadway surface and adhered to said roadway surface by a thin layer of adhesive between the strip and the roadway surface, said strip being intermittently deformed upwardly to provide successive transversely-disposed contiguous wedges of saw-tooth cross-sectional configuration, each wedge having one substantially continuous solid surface inclining upwardly and another substantially continuous solid surface inclining downwardly; said downwardly inclining surfaces being integrally covered by retroreflective means, and presenting a predetermined color, said retroreflective means comprising a highly reflective layer and refractive elements thereon for conjointly reflecting incident light in a direction opposite to the direction of incidence, said downwardly inclining surfaces forming acute angles relative to the roadway surface that are in the range from about 45° to almost 90° and said downwardly inclining surfaces being disposed on said strip so that said retroreflective means is exposed to incident light at small acute angles relative to said roadway surface for retroreflection; said upwardly inclining surfaces being differently colored, said strip having sufficient structural strength to permit it to be handled and secured to said roadway surface and being substantially flat as a whole on said roadway surface so as to avoid tire chatter for vehicles riding over the strip.

4,040,761

PIGGYBACK TRACTOR POWERED ROLLER

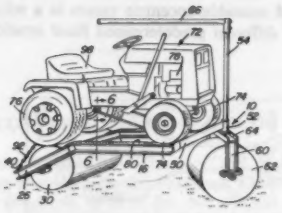
LeRoy W. Rahn, Rte. 2, Box 181 A, Waupun, Wis. 53963

Filed Nov. 23, 1976, Ser. No. 744,328

Int. Cl.[2] E01C *19/23*

U.S. Cl. 404—86 **8 Claims**

1. In combination, a roller chassis including front and rear ends, a rear horizontal transverse roller journalled from the rear end of said chassis, a front roller support dependingly supported from the front end of said chassis for oscillation about a vertical axis, a front horizontal roller journalled from said roller support, said chassis including opposite side longitudinally extending wheel ramp portions projecting forwardly from said rear roller adapted to support the front wheels of a lawn tractor rolled forwardly therealong, said chassis including a rear portion adapted to have one portion of tractor anchoring structure anchored thereto, said front roller support



including a central upwardly projecting steering shaft including a generally horizontal rearwardly projecting steering tiller arm spaced above said chassis sufficiently to receive therebeneath the forward end of a lawn tractor having its front wheels supported from said wheel ramp portions, said tiller arm projecting rearwardlyfrom said steering shaft a distance sufficient to extend to the operator's position of said lawn tractor.

4,040,762

DEVICE AT ROAD ROLLER

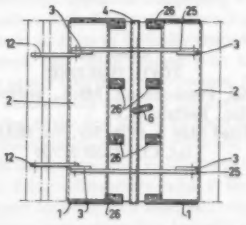
Mats Ake Nilsson, Taftea, Sweden (91035)

Filed Jan. 15, 1976, Ser. No. 649,418

Claims priority, application Sweden, Jan. 17, 1975, 7500490

Int. Cl.[2] E01C *19/26*

U.S. Cl. 404—129 **15 Claims**



1. A device for preventing material from adhering to the roll surface of a roller of a road roller, which comprises

a water tank;

an apertured spray tube leading from the water tank to and above the roll surface and intermediate the edges of the latter; and

at least one mat which abuts the roll surface and extends over the whole width thereof which mat is provided with means preventing water coming from the spray tube from flowing out in axial direction over the edges of the roll surface.

4,040,763

METHOD AND FIXTURE FOR REAMING PISTON PIN BUSHINGS IN CONNECTING RODS

Gerhard Assenmacher, 5725 Olde Stage Road, Boulder, Colo. 80302

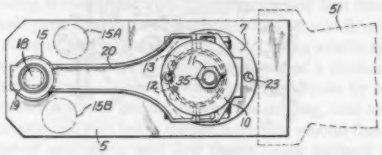
Filed Oct. 28, 1975, Ser. No. 626,050

Int. Cl.[2] B23B *35/00, 41/12*

U.S. Cl. 408—1 R **16 Claims**

1. A fixture for reaming piston pin bushings in connecting rods comprising an elongated base member having support

column means secured to one end thereof and at least one reamer guide bushing mounting means on the remaining end thereof; rotatable eccentric means mounted on said support column means supporting the crankshaft journal end of a connecting rod to be reamed; indexing means supported on said base member and including detent means coacting with means providing different predetermined fixed rotational positions for said rotatable eccentric means for setting and fixedly detaining said rotatable eccentric means in a selected one of a number of different predetermined fixed rotational positions,



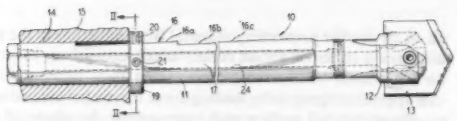
said detent means being readily adjusted to set said rotatable eccentric means in a precise easily reproduced manner to any selected one of said number of different predetermined fixed rotational positions whereby said fixture readily and with precision can be adjusted to accommodate different length connecting rods; and locking means securing a connecting rod to be reamed in position on said fixture with the crankshaft journal end thereof supported on said rotatable eccentric means and the piston pin end centered over the reamer guide bushing mounting means.

4,040,764

TOOL HOLDER

Walter Baturka, Frankenmuth, Mich., assignor to Houdaille Industries, Inc., Buffalo, N.Y.

Filed May 6, 1976, Ser. No. 683,666
Int. Cl.² B23B *51/06*
U.S. Cl. 408—59 **8 Claims**



1. A holder for holding a cutting tool in a machine tool, comprising:

a. a shank adapted at one end to support the cutting tool, the other end thereof being receivable in the machine tool and adapted to locate the holder accurately in a radial direction;

b. means intermediate said ends defining an elongated outwardly facing straight ramp extending along the length of said shank, said ramp gradually sloping radially outwardly as it extends toward said one end;

c. means on said shank defining a flat surface extending along the length of said ramp and angularly displaced therefrom; and

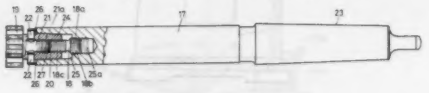
d. a lock ring surrounding said shank and clamped thereto on said ramp and on said flat surface, said ring being adapted to engage the machine tool with a side thereof facing said one end.

4,040,765

REAMER

Istvan Vig, Olten, Switzerland, assignor to Merz AG Dulliken, Dulliken, Switzerland

Filed Oct. 16, 1975, Ser. No. 622,856
Claims priority, application Switzerland, Oct. 18, 1974, 13983/74
Int. Cl.² B23B *31/04*
U.S. Cl. 408—239 A **8 Claims**



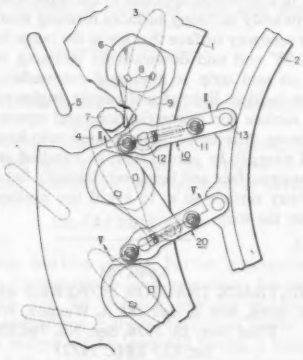
1. A reamer comprising a tool shank having at one end means for engagement in the lathe spindle of a machine tool and at the other end a conical socket; a reamer head having an integral conical butt for seating engagement in said socket to achieve precision alignment of said head with said tool shank; cooperating detent means carried on said sleeve portion and butt respectively for preventing rotation of said reamer head relative to said tool shank; and means for releasably securing the conical butt in said socket, said releasable securing means comprising a screw threaded portion arranged on the tool shank coaxially with the shank axis, an axially movable screw threaded nut means for threadwise engagement with said threaded portion, and a rigid longitudinal force-transmitting member received in and extending lengthwise of said shank for independent axial movement, means for releasably connecting said force transmitting member at one end to said butt, and means associated with said member at the other end for connecting said member to said nut means for transmitting the axial movement of the threaded nut means to said conical butt through said force transmitting member to move the conical butt into and out of said conical socket.

4,040,766

GATE PROTECTING DEVICE FOR HYDRAULIC MACHINES

Kenzi Sekido, and Tsugio Yoshikawa, both of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 17, 1976, Ser. No. 658,680
Claims priority, application Japan, Feb. 14, 1975, 50-17810
Int. Cl.² B23B *39/04*
U.S. Cl. 415—9 **12 Claims**



1. A gate protecting device for hydraulic machines having a plurality of movable gate vanes having their position controlled by a movable control member, comprising: a plurality of link means for transferring a control force from the control member to corresponding ones of the gate vanes and each

having a pair of spaced apart link members facing each other and mounted for movement toward and away from each other; a plurality of lever means for driving the gate vanes and being disposed between corresponding pairs of said link members; spring means biasing said link members towards each other to decrease the distance between said link members; connecting means normally pivotally connecting said link members to said lever means and to the control member; when the control force transmitted between one of said lever means and the control member exceeds a predetermined amount, said connecting means providing relative translation of one of said one lever means and the control member with respect to said link members; and friction means between said link members and said connecting means braking the relative translation, and including means moving said link members apart during translation against the bias of said spring means causing a frictional force resisting relative translation.

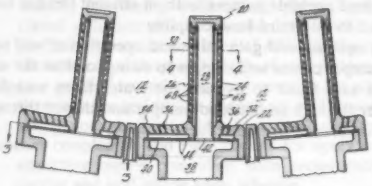
4,040,767
COOLABLE NOZZLE GUIDE VANE

James Albert Dierberger, Hebron, and Loren Hawdon White, East Hartford, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Continuation-in-part of Ser. No. 583,142, June 2, 1975, abandoned. This application Aug. 11, 1976, Ser. No. 713,734

Int. Cl.² F01D *25/12*; F02C *7/18*

U.S. Cl. 415—115 **9 Claims**



1. In a gas turbine engine having a flow path which extends axially through the turbine section of the engine, a nozzle guide vane disposed across the path, which includes:

an airfoil section comprising

a pressure wall having an inner surface and a multiplicity of cooling holes disposed therein,

a suction wall having an inner surface and a multiplicity of cooling holes disposed therein, and which is joined to the pressure wall forming an airfoil cavity therebetween,

a plurality of sealing ribs which extend from the inner surfaces of the pressure and suction walls of the airfoil section in a spanwise direction with respect to the airfoil section, and

baffle means within the airfoil cavity which contact the ribs forming a plurality of axially adjacent chambers along the inner surfaces of the platform and suction walls, the baffle means having a multiplicity of orifices which are sized and spaced to provide flow into each chamber from the airfoil cavity at a velocity which is sufficient to cause the admitted air to impinge upon the opposing inner surfaces of the airfoil walls; and

a platform section having an internal platform cavity and comprising

a pressure wall having an inner surface and a multiplicity of cooling holes disposed therein,

a suction wall having an inner surface and a multiplicity of cooling holes disposed therein,

a plurality of sealing ribs which extend into the platform cavity from the inner surfaces of the pressure and suction walls of the platform section, and

baffle means within the platform cavity which contact the ribs forming a plurality of adjacent chambers, the baffle means having a multiplicity of orifices which are sized and spaced to provide flow into each chamber from the platform cavity at a velocity which is sufficient to cause the admitted air to impinge upon the inner surfaces of the platform walls,

the cooling holes of said platform and airfoil walls and the orifices of said airfoil and platform baffle means being sized and spaced to provide a diminished cooling air pressure in each axially adjacent downstream chamber during operation of the engine.

4,040,768
MIXING, CONVEYING HEATING AND/OR COOLING APPARATUS

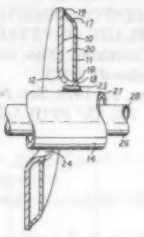
Robert Francis Christian, San Francisco, Calif., assignor to Jude Engineering Incorporated, San Francisco, Calif.

Filed Dec. 8, 1975, Ser. No. 638,633

Claims priority, application United Kingdom, Mar. 27, 1975, 12997/75

Int. Cl.² B01F *7/08*

U.S. Cl. 416—122 **4 Claims**



1. A heat exchange apparatus comprising a shaft and a hollow helical blade mounted on and surrounding the shaft, said blade being made of pairs of helically shaped split discs, the first disc of each pair being shaped with its inner margin curved into or nearly into the axial direction, the remainder of the disc being substantially radial to the shaft, and the second disc being welded to the first disc at its inner edge to the outer surface of the inner margin of the first disc and its outer margin curved towards the first disc and welded to it, the remainder of the second disc being substantially radial to the shaft, the discs being spaced apart between their inner and outer edges to form a single continuous space extending helically around the shaft and through which a heat exchange medium can flow through the hollow blade.

4,040,769
FAN WHEEL

Robert N. Britz, 105 Murphy Lake Road, Park Ridge, Ill. 60068

Filed Feb. 20, 1976, Ser. No. 659,790

Int. Cl.² F04D *29/34*

U.S. Cl. 416—213 A **5 Claims**

1. An axial flow fan wheel comprising a hub having an opening for receiving a rotatable shaft and means for attaching said hub to such shaft, a pair of axially spaced discs each having a center opening receiving said hub and being welded to said hub around said center opening, a cylindrical ring in the axial space between said discs being welded at each of its edges to one of said discs radially inwardly from the terminal edges of said discs so as to define with said terminal edges of said discs a pair of flanges which protrude radially beyond said ring, a plurality of fan blades extending radially from said ring, each blade having its inner edge contacting and generally

conforming in shape to the outer surface of said ring, said inner edge being welded to said ring, and each blade also being

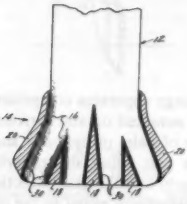
welded to each of said flanges along its front and back edges extending radially outwardly from said inner edge.

4,040,770

TRANSITION REINFORCEMENT OF COMPOSITE BLADE DOVETAILS

Robert G. Carlson, Greenhills, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Filed Dec. 22, 1975, Ser. No. 643,497
Int. Cl.[2] F01D *5/28*
U.S. Cl. 416—230 **5 Claims**



1. In a blade comprising an airfoil and dovetail including a plurality of bonded filament laminates comprising elongated filaments embedded in a matrix material, the laminates being splayed at a location along their length and receiving a metallic insert for bonding therebetween, the improvement comprising a transition material comprising a wire mesh embedded in the same matrix material, bonded along substantially the entire interface between the filament laminates and the insert, said transition material having a modulus of elasticity greater than that of the insert and less than that of the laminates.

4,040,771

LINE RELAY VALVE

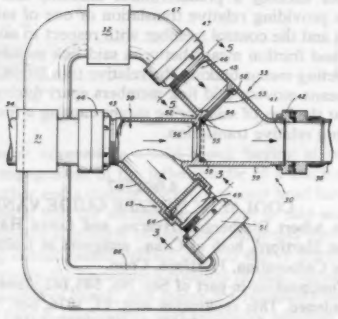
Paul A. Leach, Jaffrey, N.H., assignor to Jaffrey Fire Protection Company, Inc., Jaffrey, N.H.

Filed May 14, 1976, Ser. No. 686,452
Int. Cl.[2] E03B *5/00*
U.S. Cl. 417—62 **8 Claims**

1. In a fire fighting system of the type having a first portable pumper with an elongated influent flexible hose for connection to a distant source of water and an effluent flexible hose for directing said water onto a fire, the combination of line relay valve means, said means comprising:

a generally Z-shaped, unitary valve body having a straight tubular trunk with a first hose coupling at trunk effluent end and a second hose coupling at a trunk influent end, a first tubular branch angled to said trunk proximate said trunk effluent end and having a third hose coupling at a first branch influent end and a second tubular branch angled to said trunk proximate said trunk influent end and having a fourth hose coupling at second branch effluent end;

automatically operable valve means comprising a valve seat in said first branch, an identical valve seat in said trunk and a clapper pivoted to said body to swing from one said seat to the other for blocking flow through said branch or said trunk;



a manually operable gate valve in said second branch for blocking flow therethrough when closed;

and a second portable pumper with an influent flexible hose coupled to said third hose coupling

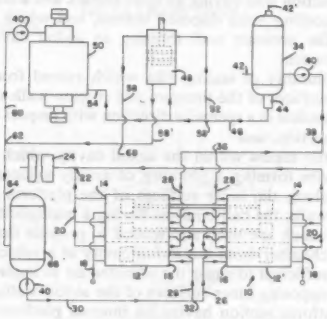
whereby opening said gate valve and operation of said second pumper causes said clapper to swing to close the said seat in said trunk to by-pass the water from said first pumper through said second pumper and thence through said first branch to said effluent hose.

4,040,772

FLUID ENERGY SYSTEM

Antonio Caldarelli, Apt. 29, Clinton Manor, 281 W. Clinton St., Dover, N.J. 07801

Filed Sept. 5, 1974, Ser. No. 503,255
Int. Cl.[2] F04B *17/00*
U.S. Cl. 417—364 **4 Claims**



1. A fluid energy system, comprising:

means defining an internal combustion engine;

said engine-defining means comprising means for generating pressured working fluid;

means for storing pressured working fluid;

means for conducting pressured working fluid from said engine-defining means to said storage means for storage; and

means for discharging stored, pressured working fluid from

said storing means for use in powering ancillary fluid-powered machines; wherein

said engine-defining means define at least one reciprocating, internal combustion engine;

said at least one engine having at least a first pair of cylinders disposed in juxtaposition, and a second pair of cylinders, also disposed in juxtaposition, and double-acting pistons, each of said cylinders having one of said pistons reciprocatable therewithin;

a first of said pistons, which is reciprocatable in one cylinder of said first pair of cylinders, is rigidly fixed to one end of a first, piston rod;

a second of said pistons, which is reciprocatable in one cylinder of said second pair of cylinders, is rigidly fixed to the other end of said first piston rod;

a third of said pistons, which is recprocatable in the other cylinder of said first pair of cylinders, is rigidly fixed to one end of a second, piston rod;

a fourth of said pistons, which is reciprocatable in the other cylinder of said second pair of cylinders, is rigidly fixed to the other end of said second piston rod; and

said first and second piston rods are commonly coupled to a single, rigid carrier for coincident reciprocation together;

said system further including

means for addressing working fluid to one of two opposite ends of each of said pistons, to cause said working fluid to be pressured by said pistons during power strokes of said pistons;

said pistons have means for communicating a quantity of working fluid addressed to said one ends thereof with slidably interfacing walls of said pistons and their associated cylinders for lubricating said walls, and means prohibiting a communication of said quantity of fluid with the other of said opposite ends of said pistons;

means coupled to said cylinders operative for admitting fuel thereinto for ignition to operate on said opposite ends of said pistons, to drive said pistons in power strokes;

means coupled to said rigid carrier for operating said fuel admitting means coincident with reciprocation of said carrier and said piston rods; wherein

said fuel admitting means comprises intake and exhaust valving;

said operating means comprises means actuable for operating said valving, and means borne by said carrier for actuating said valving-operating means;

said valving-operating means and said actuating means are co-operative to effect a lost motion, between said valving-operating means and said actuating means, to cause said valving-operating means to manifest a delayed response to motion induced in said carrier;

said carrier has recesses formed therein;

said actuating means comprises a pair of parallel, reciprocatable rods;

said latter rods are slidably disposed in said recesses, and each of said latter rods has a pair of spaced-apart prominences thereon; and

said carrier has a limb projecting therefrom, intermediate said prominences, for alternating and delayed contacting engagement directly with said spaced-apart prominences to cause reciprocation of said pair of parallel, reciprocatable rods; and

said reciprocatable rods are coupled to crank units which rotate valve-operating eccentrics.

4,040,773

OIL-WATER INTERFACE CONTROL FOR SUBMERSIBLE ELECTRIC MOTOR

John J. Tuzson, Evanston, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Nov. 24, 1975, Ser. No. 634,793
Int. Cl.[2] F04B *17/00*
U.S. Cl. 417—424 **2 Claims**

1. Apparatus for maintaining a predetermined level of the oil-well fluid interface in a seal section associated with a submersible electric motor which drives a submersible pump comprising:

a housing;

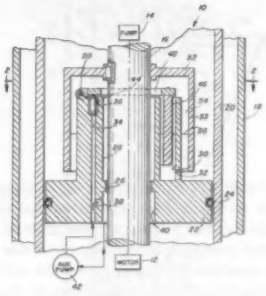
means dividing said housing into a motor compartment and a pump compartment;

an electric motor in said motor compartment, said motor compartment being filled with oil;

a pump in said pump compartment, said pump compartment being filled with well fluid;

a shaft means forming the driving connection between the motor and the pump and passing through the dividing means;

means defining a chamber in communication with said motor compartment and said pump compartment and having both oil and water with an interface therebetween;



means in said motor compartment for supplying oil under pressure to said chamber;

means comprising a valve to regulate the supply of said oil to said chamber;

sensing means comprising a float to sense the level of said interface and to control said regulating means to thereby sense changes in said interface level and regulate the supply of oil to said chamber in response to said changes in interface level;

a cup-shaped member connected to said shaft means and defining an outer rotating wall of said chamber and a cylindrical portion of said driving means, and means defining an inner stationary wall of said chamber; and

a cavity in said cylindrical portion communicating with said chamber, said float being confined in said cavity.

4,040,774

APPARATUS FOR CONSTRUCTING CONCRETE WALLS

Herman Scheller, Eaton, Colo., assignor to Research-Cottrel, Inc., Bound Brook, N.J.

Filed Apr. 29, 1976, Ser. No. 681,723
Int. Cl.[2] E04G *11/04, 11/28*
U.S. Cl. 425—65 **3 Claims**

1. Apparatus for forming a concrete wall comprising

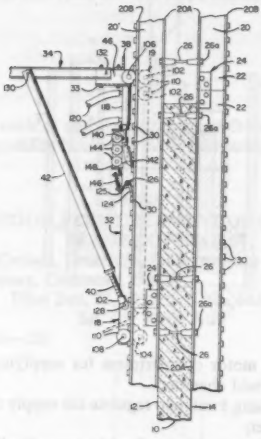
a. a plurality of generally vertical supports spaced apart along both sides of the wall being formed, each support being located opposite to another support on the other side of the wall and detachably connected to said opposing support by a plurality of spacers some of which are contained in the wall previously formed, each support consisting of separate segments detachably joined together at their ends, and the lower portion of each support being held contiguous the surface of the wall previously formed by said spacers while the upper portion extends above the portion of the wall previously formed.

b. a carriage mounted on each support with means for advancing the carriage upwardly along the supports as the wall is formed,

c. a plurality of concrete casting assemblies located along and on both sides of the wall being formed adjacent its

top, each assembly supported at its ends by two carriages on adjacent supports and each assembly having a generally vertical casting surface extending between the adjacent supports so that the assemblies and the supports together define a continuous mold extending on top of the wall into which concrete is poured, whereby as the concrete hardens the carriages and assemblies are moved upwardly on the supports to form a new level of wall and, at intervals, support segments are detached from the bottom of each support and attached to the top to provide a continuous track for the carriages,

d. each casting surface comprises the inner surfaces of generally horizontal, plywood sheets which combine to form a continuous casting surface,



e. each casting assembly comprising a plurality of generally horizontal braces positioned contiguous the outer surface of the plywood sheets to support the sheets while the concrete is setting against the inner surface of said sheets, and

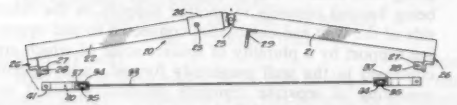
f. each casting assembly comprising at least a pair of slotted beams movably carried by adjacent carriages, said plurality of horizontal braces mounted between said slotted beams which are adapted to be wedged against said adjacent carriages, so that by wedging the slotted beams against the carriages the inner surface of the sheets are drawn into contact against the adjacent supports thereby providing said continuous mold.

4,040,775

APPARATUS FOR MAKING A PRESTRESSED CONCRETE SLAB

John A. Nordbak, 10919 Lakewood Blvd., Downey, Calif. 90241

Filed Sept. 29, 1975, Ser. No. 617,712
Int. Cl.[2] B28B *23/06*
U.S. Cl. 425—111 **4 Claims**



1. Apparatus for producing and maintaining a set of generally parallel wires in tension while enclosing them in a concrete slab, comprising:

first and second platelike means for being affixed to the opposite ends of said wires, respectively, each said platelike means including a plate having an opening within which a bar is slidingly received, said bar having openings through which the wire ends are respectively adapted to be received and bushings operatively associated with each bar adapted to be secured onto each wire end and being of dimensions greater than those of the bar openings such that said bushings are unable to pass through the bar openings;

a pair of elongated lever bars having a first end portion of each bar pivotally interconnected together and having their second end portions connected respectively to the first and second platelike means, said lever bars being of such length that when pivoted into straight line relationship the lever bars move the platelike means away from each other placing the wires in tension;

a table having a surface for supporting the tensioned wires, platelike means and lever bars;

means carried by at least one of said lever bars for locking said lever bars in said straight line relationship; and

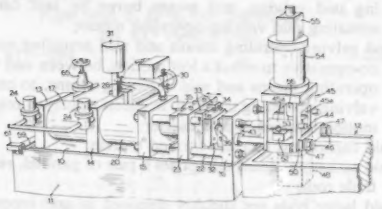
means affixing the platelike means to the table surface to maintain the tension in the wires while the lever bars are disconnected from the platelike means and plastic concrete is deposited onto said wires to form the concrete slab.

4,040,776

PRESSURE MOULDING MACHINES AND MOULD PARTS THEREFOR

Norbert R. Kelz, 45 Knoll Street, Port Colborne, Ontario, Canada

Division of Ser. No. 390,270, Aug. 21, 1973, Pat. No. 3,942,928.
This application Dec. 3, 1975, Ser. No. 637,332
Int. Cl.[2] B29F *1/00*
U.S. Cl. 425—145 **9 Claims**



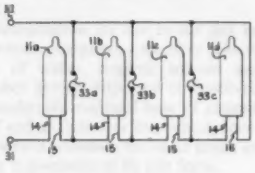
1. A pressure moulding machine comprising a base, a machine frame mounted on the base with one end fixed to the base and the other end movable thereon, means on the frame mounting two mould parts for movement relative to one another for opening and closing the mould constituted by the mould parts, motor means mounted by the frame and operatively connected to one mould part to move it relative to the other part and to hold the parts in engagement with one another under pressure, a mechanical movement detector mounted on the machine to be operative between the frame and the base for detecting movement of the movable end of the machine frame resulting from stretch of the machine frame under said pressure engagement of the mould parts by the motor means, a pump mounted by the machine injecting material into the die during a moulding operation, and control means responsive to detection by the movement detector of a predetermined movement of the movable frame end for at least initiating operation of the said pump.

4,040,777

FLASH LAMP ARRAY HAVING SHORTING LAMPS

Edward J. Collins, Euclid, and Donald C. Medved, Bellevue, both of Ohio, assignors to General Electric Company, Schenectady, N.Y.

Filed Apr. 28, 1975, Ser. No. 572,196
Int. Cl.[2] F21K 5/02
U.S. Cl. 431—95 A 15 Claims



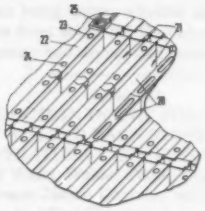
1. A photoflash lamp comprising a bulb having a hollow interior containing combustible material adapted to produce light and heat when the lamp is flashed, at least two wires extending outside of said bulb and sealed into said bulb through a seal region extending away from said interior of the bulb, and switch material coated on a portion of the exterior of said bulb and bridging across and in contact with said two wires, said switch material extending toward said bulb interior along one or more sides of said seal region and having a relatively high impedance prior to flashing of said lamp and having the characteristic of reacting to heat produced by said lamp when flashed so as to have a relatively low impedance after the lamp is flashed.

4,040,778

BAKING PIT FURNACES

William Brown Black, Bridge of Weir, Scotland, assignor to Refractory Services International Limited, Glasgow, Scotland

Filed Dec. 12, 1975, Ser. No. 640,281
Claims priority, application United Kingdom, Apr. 9, 1975, 14482/75; June 4, 1975, 24036/75
Int. Cl.[2] F27B 5/02, 5/16
U.S. Cl. 432—192 8 Claims



1. A baking pit furnace flue formed of interconnected precast refractory concrete parts including two side walls, two end walls, a bottom wall, a cap, a central baffle extending between said side walls substantially midway between said end walls of said flue, and tying means for said side walls together over each length thereof positioned between said central baffle and each one of said two end walls of said flue.

4,040,779

DRY HEAT PROCESS FOR DYEING AND PRINTING ORGANIC MATERIAL WHICH CAN BE DYED WITH CATIONIC DYES

Peter Loew, Munchenstein; Raymond Defago, Riehen, and Stefan Koller, Ramlinsburg, all of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

Filed June 11, 1975, Ser. No. 586,132

Claims priority, application Switzerland, June 12, 1974, 8039/74; Feb. 13, 1975, 1790/75

Int. Cl.[2] D06P *3/00, 5/00, 3/70*

U.S. Cl. 8—2.5 R 21 Claims

1. A dyestuff composition for use in the dry heat transfer printing process which comprises a member selected from the group consisting of water, organic solvent and mixtures thereof, said member having dispersed or dissolved therein at least one heat transferable carbinol base of cationic dye or a derivative thereof and an indicator dye which does not exhibit acid reaction and which possesses the same shade as that of the carbinol base after conversion to its salt form.

4,040,780

FLAME RETARDANT

Albert Y. Garner, Yellow Springs, Ohio, assignor to Monsanto Research Corporation, St. Louis, Mo.

Division of Ser. No. 490,608, July 22, 1974, Pat. No. 4,000,191. This application June 25, 1976, Ser. No. 699,921

Int. Cl.[2] D06M *1/00*

U.S. Cl. 8—116 P 7 Claims

1. A process for making flame-retardant material of cellulose such as cotton, paper and sponge or polyester-cotton having about 30 to 70% by weight cotton comprising treating said material with an aqueous solution of the product made by reacting cyanamide with PCl_5 followed by reaction with anhydrous ammonia in excess of that required to react with the chlorine on the cyanamide and PCl_5 intermediate product in sufficient amount and curing the treated material at a sufficient temperature to make the treated and cured material self-extinguishing when subjected to a flame-sufficient to ignite and consume the untreated material.

4,040,781

NOVEL 2-(ALKYLSULFINYL)ETHYL SULFATES AND COMPOSITIONS EMPLOYING SAME

Vincent Lamberti, Upper Saddle River, and Wilder F. Pease, Norwood, both of N.J., assignors to Lever Brothers Company, New York, N.Y.

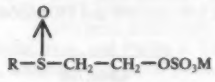
Division of Ser. No. 597,722, July 21, 1975, Pat. No. 3,986,986, which is a division of Ser. No. 476,809, June 6, 1974, Pat. No. 3,940,433. This application May 27, 1976, Ser. No. 690,690

Int. Cl.[2] B08B *3/00*

U.S. Cl. 8—137 3 Claims

1. A process for the washing of materials selected from the group consisting of fabrics and dishware which comprises the steps contacting said materials with a detergent composition comprising

a. from about 1% to about 75% of a surfactant having the structure



wherein R is a straight chain saturated aliphatic radical having from 10–20 carbon atoms and M is an alkali metal or ammonium cation,

b. from 0% to about 50% of a builder compound selected from the group consisting of (i) water-soluble inorganic alkaline salts which include alkali metal carbonates, borates, phosphates, polyphosphates, bicarbonates, silicates and hexametaphosphates and (ii) water-soluble organic alkaline salts which include aminopolycarboxylates, phytates, polyphosphonates, polycarboxylate homo and copolymers, citrates, mellitates, carboxymethyloxysuccinates, oxydiacetates and mixtures thereof.

c. from about 0% to about 25% detergent adjuvants wherein said detergent adjuvants are soil suspending agents, hydrotropes, corrosion inhibitors, dyes, perfumes, fillers, buffers, optical brighteners, perborates, bleaches, bleach activators, enzymes, suds boosters, suds depressants, germicides, fungicides, anti-tarnishing agents, fabric softening agents, opacifiers or organic solvents, and

d. the balance being water, wherein said washing temperature ranges from about 50° F to about 200° F and subsequently rinsing and drying said materials.

4,040,782

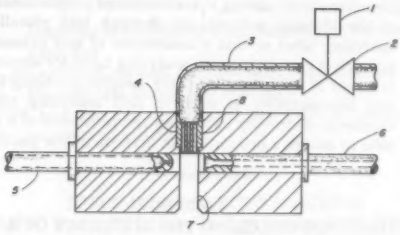
NOISE REDUCTION INSERT FOR APPARATUS TO PREVENT MELTED YARN STOPPED IN A HIGH TEMPERATURE YARN TEXTURING JET

William Robert Weiss, Walnut Creek, Calif.; Anthony Michael Saich, and James Judson Cooksey, both of Colonial Heights, Va., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Nov. 14, 1975, Ser. No. 631,810

Int. Cl.[2] D02G *1/16*

U.S. Cl. 28—271 2 Claims



1. In an apparatus to prevent melted yarn when stopped in a high temperature yarn texturing jet device, having a high temperature fluid flowing across a yarn entry, comprising a sensor to detect yarn stoppage which actuates a valve in a high pressure conduit communicating with an orifice opposite said yarn entry in said high temperature texturing jet device so that upon actuation of said valve by said sensor, a blast of high pressure fluid diverts and dilutes any undiverted said high temperature fluid flowing across said yarn entry in said texturing jet device out of said texturing jet device through said yarn entry,

the improvement comprising

a noise reduction insert at said orifice, said insert comprising a cylinder having a series of from about 5 to 10 cylindrical openings evenly distributed across said orifice and with axes parallel to said orifice axis; said cylindrical openings having a length to diameter ratio of from about 5 to 10, and said insert having a tapered inlet adjacent the inlet of said cylindrical openings.

4,040,783

METHOD OF AND APPARATUS FOR ANALYSIS OF THE EXHAUST GASES FROM INTERNAL COMBUSTION ENGINES

Lars Th. Collin, Molndal, Sweden, assignor to Lars Collin Consult AB, Molndal, Sweden

Filed Feb. 21, 1975, Ser. No. 551,683

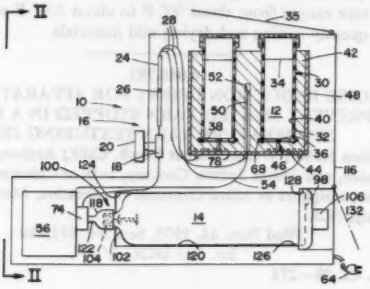
Claims priority, application Sweden, Mar. 5, 1974, 028762

Int. Cl.[2] G01N *31/00, 33/00*

U.S. Cl. 23—232 R 11 Claims

1. A method of analyzing the emission-content of exhaust gases from an internal combustion engine, comprising steps of:

(a) removing a sample of exhaust gas from an internal combustion engine over a given period of time;
(b) passing the sampled gas to a storage container;
(c) buffering said sample of exhaust gas in said storage container;
(d) passing the gas from the storage container to a plurality of parallel-connected exhaust gas analyzing tubes, each tube containing different media therein capable of indicating the presence of certain compounds contained in the exhaust gas;



(e) simultaneously passing a predetermined proportional flow of the sampled exhaust gas through said plurality of analyzing tubes so that a constituent of said exhaust gas contacts the medium in the analyzing tubes for sensing the presence of the compound in the sampled gas being tested; and incorporating in each of said analyzing tubes a resistance essentially exceeding the resistance of a single tube to ensure a proportionate division of the gas flow.

4,040,784

METHOD FOR CHECKING THE ACCURACY OF A TEST, USING A SERUM-SOLUBLE CHOLESTEROL COMPOUND

Arvind D. Deshmukh, 1011 Pearl St., Santa Monica, Calif. 90405

Filed Aug. 23, 1976, Ser. No. 716,615
Int. Cl.[2] G01N *33/16*
U.S. Cl. 23—230 B **3 Claims**

1. In a method for checking the accuracy of a test for the quantitative determination of the cholesterol content of a biological fluid wherein said test is conducted on a standard comprising a solution in said biological fluid of a known quantity of a serum-soluble cholesterol compound, the improvement in accordance with which said cholesterol compound is at least one ester of cholesterol reactively combined with a peptide or protein solubilizing agent, said ester being an ester of a lower dicarboxylic acid having 2 to 5 carbon atoms in its longest chain.

4,040,785

LYSABLE BLOOD PRESERVATIVE COMPOSITION

Young Ran Kim, Hartsdale; Leonard Ornstein, White Plains, both of N.Y., and Henry Cook Waters, III, Oxford, Conn., assignors to Technicon Instruments Corporation, Tarrytown, N.Y.

Filed Oct. 18, 1976, Ser. No. 733,435
Int. Cl.[2] G01N *33/16*
U.S. Cl. 23—230 B **13 Claims**

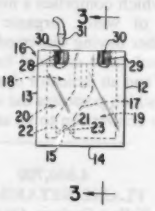
1. A preserved lysable anticoagulated blood composition comprising a mixture of blood sample and preservative reagent wherein said preservative reagent comprises an aqueous mixture of a mono-, di- or trisaccharide component and formaldehyde, the resulting preserved blood composition containing said saccharide in the range of from 0.05% to 1.0% by weight and said formaldehyde in the range of from 0.1% to 0.8% by weight.

4,040,786

CHEMICAL ANALYSIS METHOD USING REACTION CONTAINER

Ramesh C. Trivedi; Henry R. Bungay, III, both of Freehold, and Paul J. Cuccolo, Toms River, all of N.J., assignors to Worthington Biochemical Corporation, Freehold, N.J.

Division of Ser. No. 578,147, May 16, 1975, Pat. No. 3,961,899, which is a continuation-in-part of Ser. No. 473,942, May 28, 1974, abandoned. This application Feb. 12, 1976, Ser. No. 657,635
Int. Cl.[2] G01N *33/16*; C12K *1/04*; G01N *21/24*
U.S. Cl. 23—230 R **14 Claims**



1. In a method for measuring the extent of reaction between reaction reagents respectively contained in aqueous solutions wherein said solutions are commingled and the extent of reaction initiated by said commingling is measured by measuring the amount of change in optical density that follows said commingling and said solutions are respectively contained in two chambers of a reaction container and are commingled by one of said solutions being forced through an open passage the two chambers into solution in the other chamber the steps of simultaneously introducing solutions of different reagents respectively into said chambers through openings at the top of said chambers essentially without travel of either solution through said open passage into the other chamber and simultaneously reducing the reagents dissolved in said solutions to the solid state by lyophilization.

4,040,787

UREA DETERMINATION OF BIOLOGICAL FLUIDS USING DIACETYLMONOXIME REACTION

Alejo V. Roy, Carmel, and Jane R. Heiwig, Indianapolis, both of Ind., assignors to The Dow Chemical Company, Midland, Mich.

Filed Apr. 21, 1976, Ser. No. 678,811
Int. Cl.[2] C09K *3/00*; G01N *31/06, 33/16*; 252 *408*
U.S. Cl. 23—230 B **9 Claims**

5. In a method for the determination of urea nitrogen in biological fluids which comprises mixing a biological fluid with diacetylmonoxime, thiosemicarbazide, and an aqueous solution of an analytically-acceptable strong acid selected from the group consisting of sulfuric acid, phosphoric acid, hydrochloric acid, trichloroacetic acid, dichloroacetic acid and mixtures thereof, and heating the resulting mixture, the improvement which comprises the step of adding a linearity-enhancing amount of 4-aminoantipyrine to the mixture prior to the heating step, whereby a chromophor is formed having an absorbance peak between 500 and 550 nanometers when urea is present.

4,040,788

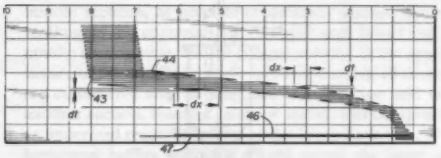
APPARATUS, INSTRUMENTATION, AND METHOD FOR COMPARING SAMPLES

Sanford L. Simons, Morrison, and Frederick M. McNeill, Denver, both of Colo., assignors to Sanford L. Simons, Morrison, Colo.

Filed Apr. 5, 1976, Ser. No. 673,765
Int. Cl.[2] G01N *33/16, 21/28*
U.S. Cl. 23—230 R **42 Claims**

38. A method for displaying representations of rates of change for a plurality of samples subjected to process and time

influences comprising providing a plurality of samples for testing, obtaining substantially continuous output status signals from each of said samples, switching each of said sample related signals on and off in a sequential manner whereby only one output signal is released at a time, applying the resulting



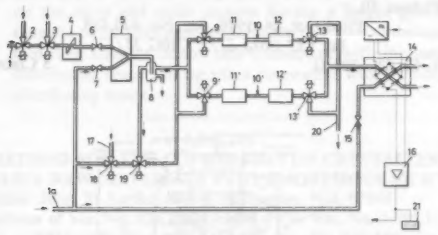
released signal to a single marking element of a chart recorder wherein the chart is moved at a regular real time rate with said marking element accordingly moving from one separate sample related signal position to another as the signal outputs are switched, and the total trace obtained is made up of separate segmental traces interconnected by time based lines whereby the length of segmental traces is indicative of rates of change for the related samples.

4,040,789

USE OF THE CONTINUOUS BLAST FURNACE GAS ANALYSIS FOR SUPERVISION AND REGULATION OF THE BLAST FURNACE OPERATION

Eitel Voss; Karl-Heinz Waldofner, both of Duisburg, and Kurt Harz, Moers, all of Germany, assignors to August Thyssen-Hutte AG, Duisburg-Hamborn, Germany

Filed Nov. 22, 1976, Ser. No. 743,831
Claims priority, application Germany, Nov. 29, 1975, 2553756
Int. Cl.[2] C21B *7/24;* G01N *25/18;* C21B *5/00*
U.S. Cl. 23—230 A **24 Claims**



1. In a process for continuously regulating the operation of a blast furnace in response to analysis of the effluent blast furnace gas containing CO, CO_2, N_2 and H_2 the improvement which comprises continuously admixing said blast furnace gas with a carrier gas, removing from the resultant admixture CO, CO_2 and H_2 and thereafter continuously feeding the remaining admixture comprising said carrier gas and said N_2 into a nitrogen measuring means.

4,040,790

MOISTURE AND RUST DETECTOR FOR HYDRAULIC CONTROL SYSTEMS

Robert B. McBride, Troy, and Phillip J. Tiberio, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed July 29, 1976, Ser. No. 709,793
Int. Cl.[2] G01N *17/00;* G01F *15/00*
U.S. Cl. 23—253 C **10 Claims**

1. In a steam turbine control system wherein hydraulic fluid is utilized to actuate steam valves the combination of:

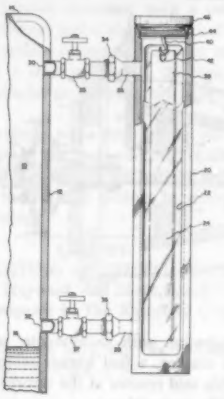
a. a reservoir for containing hydraulic fluid for said system;

b. a working fluid for said system, said working fluid having a density greater than water so that any moisture which becomes admixed with said fluid will rise to the surface of said fluid in said reservoir;

c. means for detecting the presence of water vapor in said reservoir above the level of fluid contained therein and including:

c1. a case including transparent material permitting visual inspection of the interior of said case;

c2. means for providing communication between the



reservoir at a level above the fluid level therein and said case; and

c3. a strip of material disposed within said case and visible through said transparent material;

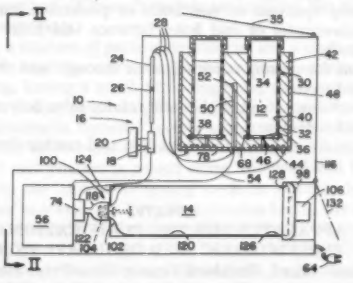
c4. said material being highly susceptible to rusting in the presence of moisture.

4,040,791

SPECIMEN COLLECTING DEVICE

David H. Kuntz, 6027 Halm St., Los Angeles, Calif. 90056

Filed June 22, 1976, Ser. No. 698,707
Int. Cl.[2] G01N *33/16, 1/10;* A61B *10/00*
U.S. Cl. 23—259 **21 Claims**



1. A urine specimen collecting device for collecting a selected specimen from a midstream portion during voiding, comprising:

a receiving chamber having an opening for receiving the voided urine;

a transfer chamber communicating with the receiving chamber for accepting urine from the receiving chamber;

means for diverting and bleeding out of said device a first portion of the urine received in the receiving chamber;

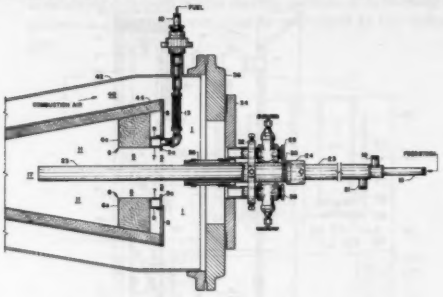
a conduit extending from the transfer chamber to a coupling for connection to an associated container for transferring the selected midstream portion through the conduit to the container; and

an overflow passage communicating with the receiving chamber above the diverting means for diverting excess urine above a predetermined level in the receiving chamber to drain out of the device, thereby bypassing the transfer chamber.

4,040,792
GAS BURNER FOR CARBON BLACK REACTOR

Don T. Norman, Sulphur, La., assignor to Continental Carbon Company, Houston, Tex.

Filed July 6, 1976, Ser. No. 703,025
Int. Cl.[2] C09C 1/50
U.S. Cl. 23—259.5 10 Claims



1. In combination with an elongate, substantially tubular carbon black reactor, a fuel burner assembly concentrically disposed within said reactor at the upstream end thereof, said burner assembly comprising:

a hollow annular metallic ring positioned coaxially within the reactor tube at its upstream end;

a fuel supply conduit being connected to said ring for supplying fuel to the hollow portion of said ring; said ring having a plurality of fuel supply holes positioned around the inner surface of said ring for discharge of fuel radially toward the axis of said reactor;

a refractory burner block defining a cylindrical tunnel coaxial with said reactor and downstream of said ring, the surface of said tunnel being aligned with the inner surface of said ring, the diameter of said tunnel being less than the diameter of said reactor tube;

a circular member or lip affixed to or a part of said ring, said lip defining an orifice of diameter less than the diameter of said cylindrical tunnel, said lip being positioned immediately upstream of said holes or positioned immediately downstream of said holes between said holes and said block;

means for passing combustion air through said orifice into said tunnel;

a combustion zone, within said reactor tube, downstream of said tunnel; and

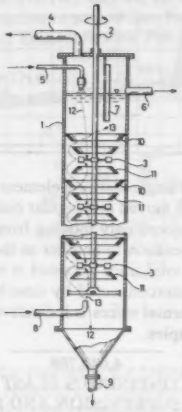
means for injecting feedstock into said reactor downstream of said tunnel.

4,040,793
APPARATUS FOR THE PURIFICATION OF TEREPHTHALIC ACID DIMETHYL ESTER

Eberhard Achsel, Fischbach,Taunus; Hans-Peter Hortig, Hattersheim (Main); Heinrich Seipp, and Heinz Giller, both of Offenbach (Main), all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Division of Ser. No. 467,833, May 7, 1974, Pat. No. 3,962,315.
This application Jan. 19, 1976, Ser. No. 650,003
Claims priority, application Germany, May 9, 1973, 2323219
Int. Cl.[2] B01D 9/00
U.S. Cl. 23—273 R 3 Claims

1. Apparatus adapted to be used in purifying a crude crystalline material comprising in combination a counter-current washing column, an inlet for said crude material in molten or solvent suspension form near the top of said column, an inlet for fresh solvent near the bottom of said column, an outlet for solvent vapors near the top of said column, an outlet for solvent containing dissolved impurities and crystals near the top of said column, an outlet for purified crystals near the bottom of said column, an agitator shaft arranged for axial rotation within said column and carrying a plurality of axially spaced paddles, a frusto-conical baffle between each pair of adjacent paddles extending inwardly and downwardly from the interior wall of said column and a frusto-conical guide plate located between each baffle and the proximate paddle of said agitator shaft, said guide plate having a central opening and being spaced inwardly from the wall of said column and converging

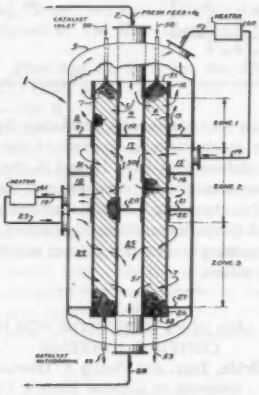


in the direction of said proximate paddle whereby vigorous agitation of the mixture of crystals and solution occurs in the central portions of said column and counter-current flow of the solution and crystals occurs in the peripheral portions of said column.

4,040,794
MOVING BED CONTACTING PROCESS AND APPARATUS

Richard D. Stone, Des Plaines, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Oct. 24, 1975, Ser. No. 625,418
Int. Cl.[2] B01J 8/12; C10G 35/12
U.S. Cl. 23—288 G 5 Claims



1. An apparatus adapted to contain a vertical annular moving bed of catalyst and at least two reaction sections comprising:

a. a vertically elongated pressure-tight vessel;

b. a vertical annular catalyst bed, whose cross-sectional area is undiminished from the top to the bottom of the vessel, within said vessel and defined by a cylindrical inner perforated screen and an outer perforated screen said screens also defining inner and outer distributing spaces;

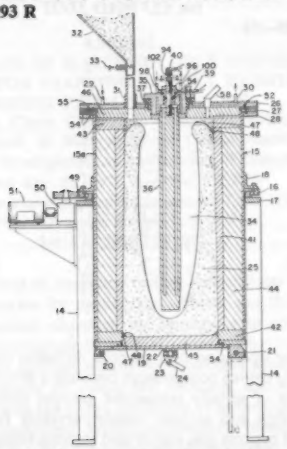
c. a catalyst outlet means connective with the bottom of the catalyst bed;
d. a reactant inlet connected to one said reaction section and a reactant outlet connected to another said reaction section;
e. said reaction section being selected from the group of an upper end section, a lower end section and one or more middle sections, as hereinafter defined, wherein the end sections of the apparatus are of upper end, lower end, or middle section type, and all central sections of the apparatus are of the middle section type, and wherein all sections are connective with at least one other section and with another section, reactant inlets or outlet, and comprising:
1. an upper end reaction defined at the lower limit thereof by horizontal baffles sealingly affixed across the inner and outer distributing spaces and by vertical baffles on the inner and outer screens having a height greater than the radial thickness of the catalyst bed, and containing two fluid transfer means one connective with the inner distributing space and the other connective with the outer distributing space;
2. a middle reaction section defined by horizontal baffles sealingly affixed at the top and bottom of the inner distributing space of the middle section, horizontal baffles, sealingly affixed at the top, bottom and middle of the outer distributing space of the middle section, and vertical screen baffles having a height greater than the radical thickness of the catalyst bed at the top, bottom and middle of the section and containing two middle section fluid transfer means, one connective with the outer distributing space above, and the other below, the horizontal baffle in the middle of the outer distributing space and providing radial out to in to out flow through said middle section;
3. a lower end reaction section defined at the upper limit thereof by horizontal baffles sealingly affixed across the inner and outer distributing spaces and by vertical baffles on the inner and outer screens having a height greater than the radial thickness of the catalyst bed and containing two fluid transfer means, one connective with the inner distributing space and the other connective with the outer distributing space.

4,040,795

METHOD FOR THE CONVERSION OF CRYSTALLINE SILICA RAW MATERIALS INTO AMORPHOUS SILICA

Lothar Jung, 31 Lurline Drive, Millington, N.J. 07946

Division of Ser. No. 476,220, June 4, 1974, Pat. No. 3,895,174.
This application Apr. 16, 1975, Ser. No. 568,431
Int. Cl.[2] C03B *5/26, 5/02;* **C01B** *33/12;* **B01J** *6/00*
U.S. Cl. 23—293 R **4 Claims**



1. In a process for the conversion of particulate crystalline silica into an amorphous silica mass by charging a furnace with the particulate crystalline silica and heating the charge to a temperature within the range of from about 1,728° to about 1,900° C for a period of time sufficient to melt and convert the silica to the amorphous state while evacuating the furnace to draw off gaseous by-products and rotating the furnace at a speed sufficient to cause the silica charge to be forced against the furnace wall, wherein the furnace is a vertically mounted rotatable electric furnace provided with a central internal resistance heating element and with a cylindrical body portion having an interior surface defining an interior of a configuration approximating a truncated cone, the base of the cone defining a bottom discharge opening, the improvement comprising:

cooling the amorphous silica mass within the furnace to a temperature within the range of **1,300°–1,400°** C to rigidify the mass and then rapidly discharging said cooled rigid mass through the furnace bottom by gravity to permit more rapid cooling.

4,040,796

FAST LIGHTING ARTIFICIAL FIRELOG

George C. Vincent, Hayward, and David Rauch, Castro Valley, both of Calif., assignors to The Kingsford Company, Louisville, Ky.

Filed June 30, 1975, Ser. No. 591,886
Int. Cl.[2] C10L *5/36, 11/00*
U.S. Cl. 44—14 **20 Claims**

1. An artificial fast lighting firelog consisting essentially of an elongated flammable body formed of particulate material and a binder, and means for fast lighting said body including means forming part of said body and defining a groove extending substantially between opposite ends of said elongated body, and a starter fuel disposed within and along said groove lying substantially coextensive therewith for igniting said body, and an over-wrapper for said firelog formed of flammable material, said over-wrapper comprising sheet material, and means carried by said over-wrapper forming an oil resistant barrier therethrough, said firelog adapted to be positioned whereby when said over-wrapper is ignited at an end thereof said fuel will ignite along the length of said groove to thereby rapidly ignite said over-wrapper along the length thereof and said firelog without removal of said over-wrapper.

20. A method of manufacturing an artificial fast lighting firelog comprising:

passing a mixture of particulate material and a binder therefor through an extrusion barrel to form an elongated firelog, having a notch extending along the outer surface of the firelog parallel to the longitudinal axis thereof and a substantially flattened surface along one side of the log adjacent said notch; disposing a starter fuel in said notch while said mixture is passed along said extrusion barrel; cutting the elongated firelog to form discrete lengths thereof as it emerges from the extrusion barrel; providing an over-wrapper of sheet material carrying an oil resistant barrier thereon; wrapping said discrete lengths with said over-wrapper to form an artificial firelog with a wrapper which may be ignited by igniting said wrapper at an end thereof and thereby igniting the starter fuel in the notch.

4,040,797

ARSENIC CONTAINING FUELS

Dean Arthur Young, Yorba Linda, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Filed Mar. 22, 1976, Ser. No. 669,314
Int. Cl.[2] C10L *1/8*
U.S. Cl. 44—68 **9 Claims**

1. A fuel composition comprising a shale oil or fraction thereof containing between 2 and 80 ppmw As, and uniformly blended therewith by dissolution one or more added metallic components selected from the class consisting of the metals, Mg, Ba, Zn, Ni, and the compounds thereof in an additive metal/arsenic atomic ratio in the range of 0.5/1 to 50/1, said components being added such that a larger proportion of the As contained in said fuel composition is retained in the ash

produced by the combustion thereof than is retained in the ash produced by the combustion of said shale oil under the same conditions.

4,040,798

HYDROCARBON COMPOSITIONS CONTAINING RUST INHIBITORS

Robert R. Kuhn, Lansdale, and Warren H. Machleder, Bluebell, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

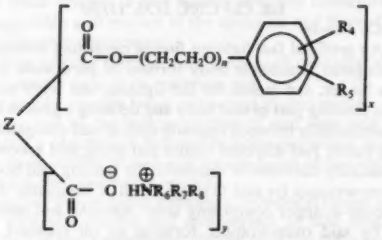
Division of Ser. No. 379,670, July 16, 1973, Pat. No. 3,912,771. This application Apr. 7, 1975, Ser. No. 565,934

The portion of the term of this patent subsequent to Jan. 1, 1991, has been disclaimed.

Int. Cl.² C10L *1/22*

U.S. Cl. 44—71 **8 Claims**

1. A composition consisting essentially of a hydrocarbon fuel or oil containing a rust inhibiting amount of a surface active alkyl ammonium carboxylate salt-ethoxylated alkyl phenol ester of a polycarboxylic acid, said acid being the polycarboxylic polymerization product of an unsaturated or hydroxy substituted aliphatic C_{16} to C_{18} monocarboxylic acid and said polymerization product having an average number of carboxylic acid groups of about 1.9 to about 3.5, said ester having the formula:



wherein *n* is an average number from about 1 to 12.5, *x* and *y* each have values such that the ratio of *x* to *y* is in the range of about 1:4 to about 4:1, and wherein:

R_4 is an alkyl group containing 4 to 12 carbon atoms;

R_5 is H or an alkyl group containing 4 to 12 carbon atoms;

R_6 is an alkyl group containing 1 to 24 carbon atoms which may be straight or branched chain or an amine substituted alkyl group of 2 of 24 carbon atoms;

R_7 is H or is the same as R_6;

R_8 is H or is the same as R_6;

Z is a saturated or unsaturated hydrocarbon residue of the acid, said residue having an average of about 34 to about 51 carbon atoms.

4,040,799

CYCLOHEXLAMINES USED AS FUEL ADDITIVES

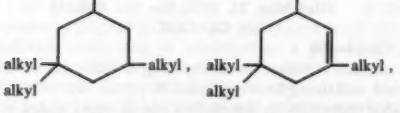
Bernardus A. Oude Alink, St. Louis; Neil E. S. Thompson, University City, and Ronald P. Hutton, St. Louis, all of Mo., assignors to Petrolite Corporation, St. Louis, Mo.

Filed Oct. 7, 1974, Ser. No. 512,424

Int. Cl.² C10L *1/22*

U.S. Cl. 44—75 **6 Claims**

1. A distillate fuel oil containing a stabilizing amount of a compound of the formula



or combinations thereof, where A represents an amino group having no more than one hydrogen atom attached to the nitrogen atom, with the remaining groups of the amine not interfering with reductive amination.

4,040,800

REACTOR FOR GASIFYING SOLID FUELS, PARTICULARLY COAL, UNDER SUPERATMOSPHERIC PRESSURE

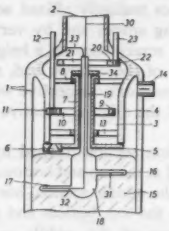
Paul Rudolph, Bad Homburg; Herbert Bierbach, Frankfurt am Main; Hans Küpfer, Frankfurt am Main; Carl Hafke, Frankfurt am Main, and Rudolf Kohlen, Wehrheim, all of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Filed Aug. 17, 1976, Ser. No. 715,077

Claims priority, application Germany, Feb. 26, 1976, 2607742

Int. Cl.² C10J *3/30, 3/32*

U.S. Cl. 48—85.2 **3 Claims**



1. An apparatus for gasifying solid fuels in a packed bed by a treatment with a free oxygen-containing gas and water vapor under pressure, comprising a water-cooled reactor housing provided in its lower portion with gasifying agent inlet openings, a fuel distributor mounted on a vertical hollow bearing shaft in the upper portion of the reactor, a rotatable distributing disc attached to the lower end of said bearing shaft, a stirrer mounted on a stirrer shaft, said stirrer being disposed in the fuel bed in the upper portion of the reactor, and independent first and second drive means for independently rotating the fuel distributor and stirrer.

4,040,801

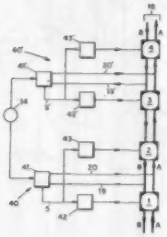
METHOD AND APPARATUS FOR RAPID ADJUSTMENT OF PROCESS GAS INVENTORY IN GASEOUS DIFFUSION CASCADES

Robert H. Dyer; Andrew H. Fowler, and Paul R. Vanstrum, all of Oak Ridge, Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Continuation of Ser. No. 674,201, April 5, 1976, abandoned. This application June 14, 1976, Ser. No. 696,149

Int. Cl.² B01D *53/22*

U.S. Cl. 55—16 **12 Claims**



1. In the operation of a gaseous diffusion cascade wherein electrically driven compressors circulate a process gas through a plurality of serially connected gaseous diffusion stages to establish first and second countercurrently flowing cascade streams of process gas, one of said streams being at a relatively low pressure and enriched in a component of said process gas

and the other being at a higher pressure and depleted in the same, and wherein automatic control systems position process gas flow control valves to maintain the stage process gas pressures at values which are functions of reference-signal inputs to said systems, the improved method of altering the cascade process gas inventory while said cascade is operating comprising:

simultaneously directing into separate process-gas freezing zones a plurality of substreams derived from one of said first and second streams at different points along the lengths thereof to solidify approximately equal weights of process gas in said zones while reducing said reference-signal inputs to maintain the positions of said control valves substantially unchanged despite the removal of process gas inventory via said substreams, and subsequently

4. In the operation of a gaseous diffusion cascade wherein electrically driven compressors circulate a process gas through a plurality of serially connected gaseous diffusion stages to establish first and second countercurrently flowing cascade streams of process gas, one of said streams being at a relatively low pressure and enriched in a component of said process gas and the other being at a higher pressure and depleted in the same, and wherein automatic control systems position process gas flow control valves to maintain the stage process gas pressures at values which are functions of reference-signal inputs to said systems, the improved method of altering the cascade process gas inventory while said cascade is operating comprising:

simultaneously directing into separate process-gas freezing zones a plurality of substreams derived from one of said first and second streams at different points along the lengths thereof to solidify approximately equal weights of process gas in said zones while reducing said reference-signal inputs to maintain the positions of said control valves substantially unchanged despite the removal of process gas inventory via said substreams, and subsequently regenerating separate substreams of said process gas by evaporating the solids in said zones and introducing the regenerated substreams to the other of said streams at different points along the length thereof while increasing said reference-signal inputs to maintain the position of said control valves substantially unchanged despite the addition of process gas via the regenerated substreams.

4,040,802

ACTIVATION OF WATER SOLUBLE AMINES BY HALOGENS FOR TRAPPING METHYL RADIOACTIVE IODINE FROM AIR STREAMS

Victor R. Deitz, Chevy Chase, and Charles H. Blachly, West Hyattsville, both of Md., assignors United States Energy Research and Development Administration, Washington, D.C.

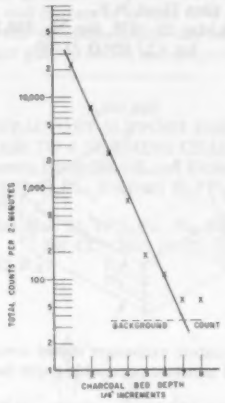
Filed Apr. 22, 1975, Ser. No. 570,925

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.[2] B01D *53/04*

U.S. Cl. 55—71 **1 Claim**

1. In the method of removing methyl iodine[131] gas from the effluent of a reactor by passing the effluent gas through an organic impregnated charcoal, the improvement comprising employing an impregnated charcoal prepared by contacting charcoal with an aqueous mixture of a halogen selected from the group consisting of iodine and bromine, and a tertiary amine selected from the group consisting of hexamethylenetetramine, triethyanolamine, triethylenediamine, N-methylmorpholine, N, N, N′, N′-tetramethylethylenediamine, 1, dimethylamino-2-propanol, N-methylpiperazine, and N, N, N′, N′-tetramethyl-1,4-butanediamine, wherein the concentration of halogen in the charcoal is between 0.4 and 1.6%, and the



concentration of tertiary amine in the charcoal is between 2 and 7%, based on the weight of the charcoal.

4,040,803

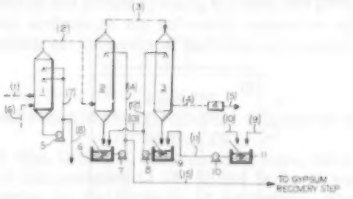
WET WASTE FLUE GAS DESULFURIZING PROCESS USING LIME AS ABSORBENT

Masumi Atsukawa; Kazumi Kamei; Naoharu Shinoda, and Hiroyuki Ushio, all of Hiroshima, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 549,031, Feb. 11, 1975, abandoned, which is a continuation-in-part of Ser. No. 298,822, Oct. 19, 1972, abandoned. This application Mar. 18, 1976, Ser. No. 667,972

Int. Cl.[2] B01D *53/14*

U.S. Cl. 55—73 **1 Claim**

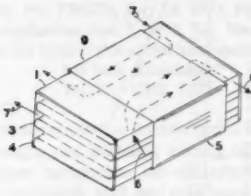


1. In a wet waste flue gas desulfurizing process using lime as absorbent, wherein a sulfur oxide-containing waste flue gas is washed with a liquid absorbent containing calcium hydroxide or calcium carbonate for the purpose of removing the sulfur oxide from said waste flue gas, the improvement wherein a liquid absorbent is circulated through an absorbing device divided into two stages arranged in tandem with respect to the flow of the waste flue gas, said liquid absorbent being circulated and controlled in both stages, such that in the first state absorbing device the liquid absorbent has a lime available percentage of more than 96% and controlled in the second stage absorbing device such that the liquid absorbent has a lime available percentage of 85–95%.

4,040,804
HEAT AND MOISTURE EXCHANGER

Henry Harrison, Locust Valley, N.Y., assignor to Halm Instrument Co., Inc., Glen Head, N.Y.

Filed May 23, 1975, Ser. No. 580,317
Int. Cl.[2] B01D *13/00*
U.S. Cl. 55—158 5 Claims



1. Heat and moisture exchanger means comprising a folded sheet of heat and moisture permeable paper having a plurality of folds,

means between said folds to separate said folds,

means closing the end of the folds,

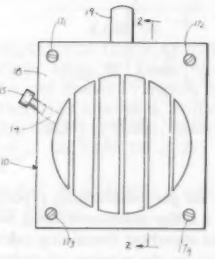
impermeable means connected to and surrounding the central part of said folded sheet to support said folded sheet and to provide a plurality of air passages on one side of the sheet interleaved in juxtaposition with a plurality of air passages on the other side of the sheet,

means connected to the folded sheet to direct air in one direction through said folds on one side of said folded paper, the return air flowing in the opposite direction through said folds on the other side of said folded paper whereby water and heat are transferred through the paper between one air stream and the other air stream flowing in the opposite direction.

4,040,805
PERSONAL MONITORING DEVICE, OR DOSIMETER, FOR MEASURING EXPOSURE OF PERSONNEL TO ORGANIC VAPORS

Leonard H. Nelms; Kenneth D. Reiszner, and Philip W. West, all of Baton Rouge, La., assignors to Board of Supervisors Louisiana State University Agricultural and Mechanical College, Baton Rouge, La.

Filed Oct. 22, 1976, Ser. No. 735,010
Int. Cl.[2] B01D *13/00*
U.S. Cl. 55—158 10 Claims

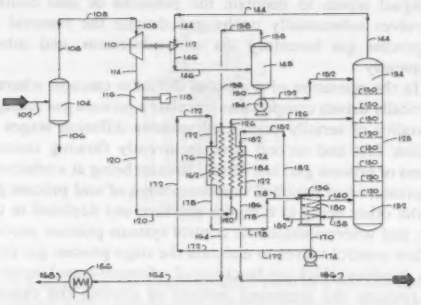


10. A monitoring device useful for the detection and and quantification of the exposure of a wearer of the device to an air-vinyl chloride mixture, which comprises: a body provided with a shallow top cavity which is filled with particulate activated carbon, covered and physically retained in place by a membrane permeable to vinyl chloride which is dissolved within, transported through, then released from the opposite side of said membrane and then adsorbed on the activated carbon in direct proportion to the exposure of the wearer to vinyl chloride as related to the external vinyl chloride concentration and time of exposure.

4,040,806
PROCESS FOR PURIFYING HYDROCARBON GAS STREAMS

Kenneth B. Kennedy, Rte. 2, Box 343, Lee's Summit, Mo. 64063

Continuation of Ser. No. 218,884, Jan. 19, 1972, abandoned. This application May 3, 1976, Ser. No. 682,486
Int. Cl.[2] F25J *3/02*
U.S. Cl. 62—28 2 Claims



1. A method for separating a non-combustible, nitrogen-rich gaseous feed mixture comprising nitrogen present in the amount of 50 to 80 mole percent and one or more hydrocarbons present in the total amount of 50 to 20 mole percent, into a nitrogen-rich overhead gas product and a combustible hydrocarbon-rich bottom liquid product, said method consisting of the steps of:

1. first cooling said gaseous feed mixture to a temperature below the lowest boiling point of any hydrocarbon present to be separated as a liquid product thereby providing a partially liquefied feed mixture;
2. distilling said partially liquefied feed mixture in a plural stage distillation apparatus so as to form an overhead gas phase and combustible, bottom liquid phase product richer in hydrocarbon then said gaseous feed mixture at a pressure below the critical pressure of both said overhead and bottom products;
3. passing the overhead gas phase directly from the distillation step (2) through turbo-expander means so as to provide an inlet/outlet pressure ratio of between10-1 to 20-1, said ratio being sufficient distillation step (2), in a quantity sufficient to enable recovery of said combustible bottom liquid phase product from said non-combustible feed mixture

(4) thereafter using at least a porion of said overhead gas product as a refrigerant to cool the gaseous feed mixture.

4,040,807
DRAWING DIELECTRIC OPTICAL WAVEGUIDES

John Edwin Midwinter, Ipswich, and Clive Richard Day, London, both of England, assignors to The Post Office, London, England

Filed June 30, 1975, Ser. No. 591,958
Claims priority, application United Kingdom, July 10, 1974, 30525/74
Int. Cl.[2] C03C *25/02;* C03B *5/26, 3/00*
U.S. Cl. 65—3 A 16 Claims

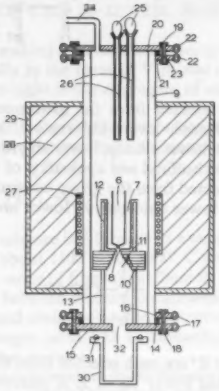
1. A method of manufacturing a bubble-free dielectric optical waveguide comprising:

loading preformed core and cladding glasses in rod form into the inner and outer compartments respectively of a metallic double crucible, having concentric adjacent out-

let orifices, cladding glass being loaded in said outer and core glass in said inner compartment

melting the glasses in said crucible;

completely surrounding the double crucible containing melted glasses with a nonoxidising atmosphere;



drawing from said orifices core and cladding glasses to form a clad dielectric optical waveguide; and continuously replenishing said inner and outer compartments of the double crucible by feeding preformed core and cladding glass rods having a diameter between 3 and 10 millimeters into the glass melt at a rate less than 30 millimeters per minute thereby avoiding pulling gas into the glass melt.

4,040,808

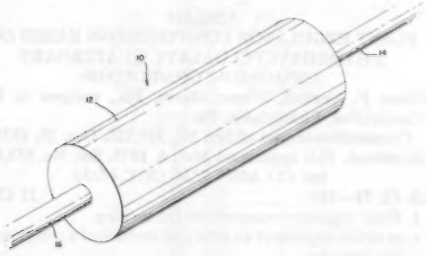
METHOD FOR MANUFACTURE OF VANADIUM DIOXIDE POLYCONDUCTORS

David Kahn, and Raymond James Geckle, both of Harrisburg, Pa., assignors to AMP Incorported, Harrisburg, Pa.

Division of Ser. No. 479,242, June 14, 1974, Pat. No. 3,983,074. This application July 24, 1975, Ser. No. 598,913

Int. Cl.[2] C03B *32/00, 35/00;* H01B *1/06*

U.S. Cl. 65—33 **4 Claims**



1. A method for the production of a polyconducting device comprising vanadium dioxide in a binder by the steps comprising:

a. admixing, (1) a member selected from the group consisting of particulate vanadium dioxide, and (2) doped vanadium oxide, wherein the dopant is an oxide selected from the group consisting of Cr, Fe, Ga, Al, Ti, Os, Ru, Ge, Nb, Ta, Mo and W, and mixtures of oxides of the same, with particulate binder in a ratio of from 5–50%, said particulate binder consisting essentially of 80% to 50% of vanadium pentoxide with complementary proportions of phosphorus pentoxide, to obtain a powdered mixture of said binder and said vanadium dioxide;

b. heating said mixture to effect melting of the binder to produce a glass;

c. shaping said glass under a pressure sufficient to achieve a density in said mixture of at least 80% of the theoretical density of the vanadium dioxide and binder; and

d. cooling said glass to obtain said polyconductive device.

4,040,809

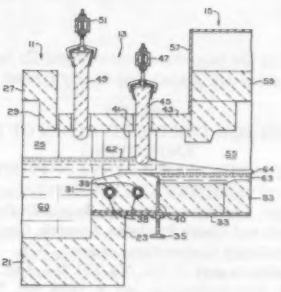
GLAZED REFRACTORY SUPPORT FOR DELIVERING GLASS TO A FORMING CHAMBER

George A. Pecoraro, Lower Burrell, and Richard L. Bayne, New Kensington, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Mar. 26, 1976, Ser. No. 670,597

Int. Cl.[2] C03B *18/02*

U.S. Cl. 65—182 R **10 Claims**



1. In an apparatus for making flat glass comprising a glass furnace connected to a forming chamber through a molten glass delivery facility wherein the forming chamber includes an impervious metal casing having an inner refractory liner containing a pool of molten metal for supporting glass during forming and the delivery facility includes a refractory support for supporting molten glass during its delivery to the forming chamber, the refractory support having glass contacting surfaces and outer surfaces, the improvement which comprises

a substantially impervious, glazed, refractory layer of differing composition from that of the refractory support disposed on and affixed by fusing to a sufficient portion of the outer surfaces of the refractory support to effectively diminish the diffusivity of the refractory support.

4,040,810

APPARATUS AND METHOD FOR TREATING WASTE PRODUCTS

Harry J. Eby, Greenbelt, and Neal O. Morgan, Silver Spring, both of Md., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Mar. 10, 1976, Ser. No. 665,586

Int. Cl.[2] C05F *11/08*

U.S. Cl. 71—9 **1 Claim**

1. A process for treating manure, culturing fly larvae and recovering products formed during the treatment, comprising:

a. loading the manure into a rotatable bioreducing unit;

b. adding fly eggs to the manure in the unit;

c. aerating the manure-fly egg mixture in the unit;

d. allowing the fly eggs to hatch to the larval stage;

e. tumbling the manure-fly larvae mixture while circulating air through the unit to provide an environment for the larvae to burrow at least a foot and a half into the manure and for the manure to be dynamically bioreduced;

f. converting gases exhausted from the unit to salts and recovering the salts;

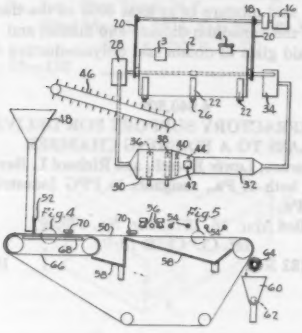


Fig. 4 Fig. 5

g. separating the bioreduced manure and fly larvae; and

h. dehydrating and granulating the fly larvae.

4,040,811

METHOD FOR THE CULTIVATION OF PLANTS EMPLOYING N-ALKYL-N-PHENYLSULFENYL-N'-PHENYL-FORMAMIDINE DERIVATIVES

Manfred Böger, Haltingen, Germany; Joseph Drabek, Allschwil, Switzerland, and Georg Pissiotas, Lorrach, Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 551,464, Feb. 20, 1975, abandoned. This application Jan. 9, 1976, Ser. No. 647,840

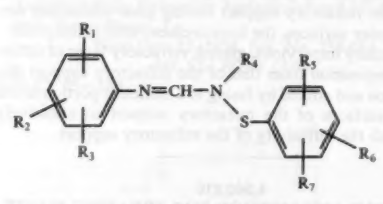
Claims priority, application Switzerland, Feb. 25, 1974, 2630/74; July 30, 1974, 10472/74; Sept. 10, 1974, 12300/74; Feb. 7, 1975, 1549/75

Int. Cl.² A01N *5/00*

U.S. Cl. 71—78 **5 Claims**

1. A method for inhibiting the growth of lateral suckers on tobacco plants, which method comprises applying to the tobacco plant an effective sucker growth inhibiting amount of a compound of the formula I

(I)



wherein

R_1, R_2 and R_3, independently of one another, represent hydrogen, chlorine, bromine, methyl, ethyl, trifluoromethyl or cyano,

R_4 represents methyl or ethyl and

R_5, R_6 and R_7, independently of one another, represent hydrogen, chlorine, bromine or C_1–C_4–alkyl.

4,040,812

HERBICIDAL CARBONATES AND THIOCARBONATES OF THIADIAZOLYL-2(1H)-PYRIMIDINONES

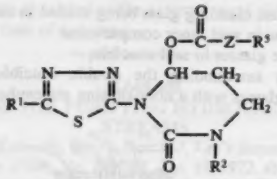
John Krenzer, Oak Park, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Filed June 18, 1975, Ser. No. 587,944

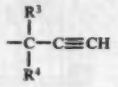
Int. Cl.² A01N *9/12*; C07D *239/04*

U.S. Cl. 71—90 **10 Claims**

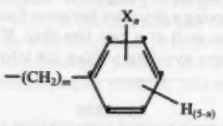
1. A compound of the formula



wherein R^1 is selected from the group consisting of lower alkyl, lower alkenyl, lower chloroalkyl, lower bromoalkyl, trifluoromethyl, lower alkoxy, lower alkylthio, lower alkylsulfonyl, lower alkylsulfinyl and cycloalkyl of from 3 to 7 carbon atoms; R^2 is selected from the group consisting of lower alkyl, lower alkenyl, lower chloroalkyl, lower bromoalkyl and



wherein R^3 and R^4 are each selected from the group consisting of hydrogen and lower alkyl; Z is selected from the group consisting of oxygen and sulfur; and R^5 is selected from the group consisting of lower alkyl, lower chloroalkyl, lower bromoalkyl, lower alkenyl, lower alkynyl, lower alkoxyalkyl, cycloalkyl of from 3 to 7 carbon atoms and



wherein X is selected from the group consisting of lower alkyl, halogen, lower haloalkyl, nitro, cyano and lower alkoxy, and *m* and *n* are each integers from 0 to 3.

10. A method of controlling weeds which comprises contacting said weeds with a herbicidal composition comprising an inert carrier and, as the essential active ingredient, in a quantity toxic to weeds, a compound of claim **1**.

4,040,813

PLANT REGULATOR COMPOSITIONS BASED ON 2-HYDROXYCYCLOALKYL QUATERNARY AMMONIUM COMPOUNDS

William F. Newhall, Winter Haven, Fla., assignor to FMC Corporation, Philadelphia, Pa.

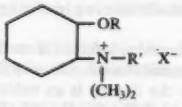
Continuation-in-part of Ser. No. 319,126, Dec. 29, 1972, abandoned. This application Mar. 6, 1975, Ser. No. 555,952

Int. Cl.² A01N *9/24*; C07C *87/36*

U.S. Cl. 71—121 **21 Claims**

1. Plant regulator composition comprising

a. as active ingredient an effective amount of a compound of the formula:



wherein R is H, alkanoyl of 2–3 carbon atoms, or benzoyl; R' is a straight or branched, saturated or unsaturated hydrocarbon radical of 6–16 carbon atoms; and X is an agriculturally acceptable, non-phytotoxic anion;

b. an inert agricultural carrier; and

c. a compatible surface-active agent.

4,040,814
METHOD OF PRODUCING A COMPOSITION CONTAINING A LARGE AMOUNT OF VANADIUM AND NITROGEN

Rodney Francis Merkert, Buffalo, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Filed Dec. 23, 1975, Ser. No. 643,682
Int. Cl.² C22B *34/22*; C22C *38/12*
U.S. Cl. 75—.5 BC **2 Claims**

1. A method for making a material containing vanadium and nitrogen substantially in the form of V_2N and containing less than about 2% by weight in the aggregate of carbon and oxygen said method comprising

i. providing a mixture of V_2O_3 and carbon in substantially stoichiometric proportions in accordance with the following formula:

$$V_2O_3 + 3\,C \rightarrow 2\,V + 3\,CO$$

ii. subjecting the mixture in a furnace to a temperature in the range of from about 1100° C to 1500° C under a reduced pressure in the range of from about 5mm to 100 microns to cause reaction between mixture constituents and the evolution of CO and maintaining the temperature and pressure in said ranges until CO is substantially no longer evolved from the mixture

iii. maintaining the temperature in the furnace in the range of about 1100° C to 1500° C and introducing nitrogen gas into the furnace to provide a nitrogen atmosphere in the furnace at a pressure of at least about 0.25 atmosphere

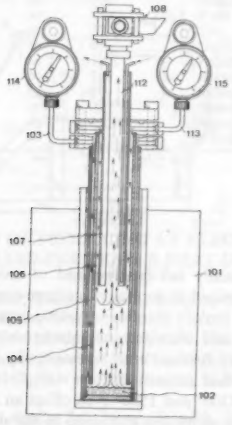
iv. thereafter repeating, in sequence, step (ii), step (iii) and step (ii) until the nitrogen content of the mixture is in the range of about 10 to 12 by weight

v. subsequently cooling the mixture in a nonoxidizing environment.

4,040,815
VERY FINELY DIVIDED LITHIUM AND PROCESS FOR MANUFACTURING SAME

Bernard Francois, Strasbourg; Michel Vernois, Puteaux; Paul Martin, Lutzelhouse, and Emile Franta, Souffelweyershein, all of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly sur Seine, France

Filed Jan. 30, 1976, Ser. No. 653,747
Claims priority, application France, Feb. 7, 1975, 75.03890
Int. Cl.² C22C *1/04*
U.S. Cl. 75—.5 B **6 Claims**

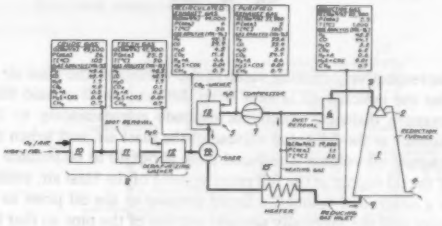


1. A process for preparing very finely divided lithium comprising filtering a mixture of inert gas and fine particles of lithium in suspension in the said gas on a bed of solid bodies which can be renewed, notably by stirring, the mesh size of said bodies, the height of said bed and the speed of stirring being such that the metal particles are retained without causing a metallic slab to be formed on the surface.

4,040,816
PROCESS FOR THE PRODUCTION OF SPONGE IRON

Klaus Altenhöner, Gahlen; Walter Jansen, Mulheim; Klaus Knop, Oberhausen; Ulrich Pohl, Dinslaken, all of Germany, and Jan G. Reerink, Rio de Janeiro, Brazil, assignors to Thyssen Purofer GmbH, Dusseldorf, Germany

Filed Dec. 17, 1975, Ser. No. 641,618
Claims priority, application Germany, Dec. 18, 1974, 2459876
Int. Cl.² C21B *13/00*
U.S. Cl. 75—35 **7 Claims**



1. In a process for the production of sponge iron from iron ore, wherein the iron ore is introduced into the head of a shaft furnace and reduced iron is removed from the bottom thereof as sponge iron, the iron ore being contacted during its descent in the furnace with hot reduction gas produced from a carbon-containing energy carrier and consisting predominantly of carbon monoxide and hydrogen, the improvement wherein:

a. said reduction gas is formed

a_1. in part by a desulfurized fresh gas produced by a partial oxidation of a hydrocarbon and desulfurization, and

a_2. in part by recirculated exhaust gas drawn from the head of said furnace having its carbon oxide content reduced by about 10 volume percent;

b. said fresh gas is mixed with said exhaust gas in a volume ratio of fresh-gas/exhaust-gas of 0.8 : 1.0 to produce a cold mixed gas having the following composition:

Hydrogen	about 45 volume percent
Carbon Monoxide	about 44 volume percent
Water Vapor	about 3 volume percent
Carbon Dioxide	about 6 volume percent
Balance, in trace amounts: lower hydrocarbons, nitrogen and impurities;	

c. said mixed gas is heated to a temperature of about 1000° C directly before being introduced into said shaft furnace as said reductin gas; and

d. a heated mixed gas is introduced into the shaft furnace at the latter temperature.

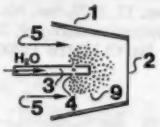
4,040,817
METHOD FOR THE REDUCTION OF IRON ORES IN A SHAFT FURNACE, ESPECIALLY IN A BLAST FURNACE WITH OIL INJECTION

Friedrich August Karl Luth, Luegplatz 3, 4 Dusseldorf-Oberkassel, Germany

Filed Oct. 4, 1974, Ser. No. 512,152
Claims priority, application Germany, Oct. 4, 1973, 2349930
Int. Cl.² C21B *5/00*
U.S. Cl. 75—42 **6 Claims**

1. A method of reducing iron ores into pig iron in a shaft furnace, wherein a stream consisting of oil is injected through at least one pipe having a nozzle head, each pipe being ar-

ranged in the area of the longitudinal axis of a blast tuyere through which tuyere blast air heated to a high temperature is blown into the furnace, the oil being injected radially outwards in the form of injection jets at an outlet velocity at which said oil is distributed into said blast air flow up to a position closely adjacent the inner wall of said blast tuyere, said pipe and said nozzle head, at least in portions thereof, are subjected to the high temperature of the blast air, which method comprises continuously controlling the ratio of the volume of the oil relative to the introduced volume of the blast air in response of



the respectively existing value of the volume of the blast air so that the injected oil is kept from the inner wall of said blast tuyere a distance which corresponds approximately to the distance at the full rated volume of the blast air, and, when the injected oil volume is reduced from about 40 to 60 volume % of the oil supply at the full rated volume of the blast air, adding in a controlled manner, a liquid coolant to the oil prior to its entry into the thermally stressed portion of the pipe so that the total amount of the oil and of the coolant ensures a cooling effect which safely prevents clogging of said pipe by setting or stopping of the flow of the oil due to temperature influence.

4,040,818

ADDITION OF MAGNESIUM TO MOLTEN METAL

Gordon A. Clegg, Rossendale; Geoffrey Maurice Cull, Salford; Phillip Andrew Fisher, Urmston, and William Unsworth, Manchester, all of England, assignors to Magnesium Elektron Limited, Manchester, England

Filed Nov. 17, 1975, Ser. No. 632,823

Claims priority, application United Kingdom, Nov. 20, 1974, 50263/74

Int. Cl.² C22C *33/08*

U.S. Cl. 75—58 **21 Claims**

1. An additive for a ferrous melt comprising an agglomerated, substantially homogeneous mixture of from 15 to 50% by weight of magnesium particles and from 1 to 10% by weight of calcium fluoride, the balance comprising particles of a refractory material which is inert to magnesium at the melting point of the latter, the refractory material providing a coherent metal-permeable matrix when subjected to the temperature of the ferrous melt.

4,040,819

BASIC OXYGEN STEEL FURNACE AND PROCESS

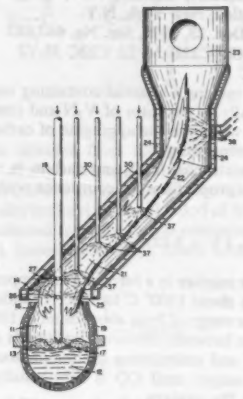
Gerald L. Rounds, Box 1074, Fontana, Calif. 92335

Filed Aug. 6, 1976, Ser. No. 712,352

Int. Cl.² C21C *5/38*

U.S. Cl. 75—60 **6 Claims**

1. In a method of producing steel, of the type wherein oxygen is blown into a charge comprising molten metal and slag-forming components within a furnace, having a mouth, to generate the heat of reaction required to refine the metal, and wherein generated off-flow gases are removed from the furnace by passage through a hood above the mouth of the furnace, the improvement comprising the step of contacting the off-flow gases with oxygen by introducing a stream of substantially pure oxygen into the hood above the mouth of the fur-



nace whereby to oxidize the carbon monoxide component of said off-flow gases to carbon dioxide.

4,040,820

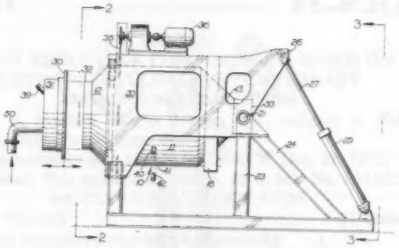
PROCESSING ALUMINUM SKIM

James A. Loach, Vienna, and Harold R. Kirby, Ripley, both of W. Va., assignors to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.

Filed Feb. 9, 1976, Ser. No. 656,690

Int. Cl.² C22B *7/04*

U.S. Cl. 75—68 R **12 Claims**



1. An essentially salt-free method of recovering metallic aluminum entrained in molten aluminum-containing skim removed from a molten aluminum surface comprising,

a. tumbling said aluminum-containing skim in a refractory lined rotary furnace with an essentially halide-free atmosphere, while maintaining the temperature of the skim between 1200° and 1500° F to effect an agglomeration of the molten aluminum entrained in the skim and a separation thereof from the skim;

b. discharging the separated molten aluminum from the rotary furnace; and then

c. discharging the essentially aluminum-free skim from the rotary furnace.

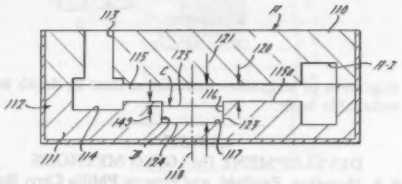
4,040,821
NODULARIZING CATALYST FOR CAST IRON AND METHOD OF MAKING SAME

Adolf Hetke, Livonia; Prem P. Mohla, Plymouth, and Robert J. Warrick, Ann Arbor, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 606,908, Aug. 22, 1975. This application Aug. 4, 1976, Ser. No. 711,680

Int. Cl.[2] C22C *33/08, 28/00*

U.S. Cl. 75—134 S **4 Claims**



1. A nodularizing agent in unitary discrete form suitable for placement in an interior recess of a mold gating system, said agent having a solid impervious brittle body consisting essentially of an iron-silicon base alloyed with 5–15% by weight of nodularizing elements effective to cause the formation of spheroidal graphite during solidification of cast iron, said body having substantially flat side and bottom walls to mate snugly with said mold gating system for the substantial exclusion of molten metal therebetween.

4,040,822
ALUMINUM BASE FLUXLESS BRAZING ALLOY

Marvin J. Stern, Seattle, Wash., assignor to Alloy Metals, Inc., Troy, Mich.

Continuation-in-part of Ser. No. 433,016, Jan. 10, 1974, abandoned. This application Oct. 6, 1975, Ser. No. 620,091

Int. Cl.[2] C22C *21/12*

U.S. Cl. 75—140 **17 Claims**

1. A fluxless brazing alloy suitable for brazing aluminum, having a brazing temperature of about 1080° F, or less, consisting essentially of, by weight:

4	to	15%	Silicon
0.1	to	5%	Magnesium
0.1	to	5%	Rare earth
1	to	3%	Tin
0	to	6%	Gallium
0	to	10%	Palladium
0	to	5%	Copper
0	to	8%	Silver
0	to	0.25%	Bismuth
0	to	0.25%	Strontium, and
the Balance			Aluminum.

4,040,823
METHOD OF PRODUCING AN ELECTRICAL RESISTANT FLUID-PERMEABLE HEAT GENERATING MEMBER

Takeshi Yamaguchi, Tokyo, Japan, assignor to Lorraine M. Cleland, Milwaukee, Wis.

Division of Ser. No. 497,821, Aug. 15, 1974, Pat. No. 3,965,047, which is continuation-in-part of Ser. No. 260,133, June 6, 1972, Pat. No. 3,828,161. This application Apr. 9, 1976, Ser. No. 675,528

Claims priority, application Japan, July 20, 1971, 46-54014

Int. Cl.[2] B22F *1/00*

U.S. Cl. 75—203 **9 Claims**

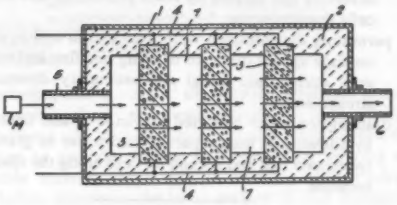
1. A method of manufacturing sintered electrically resistive fluid-permeable heat generating members comprising the sequential steps of:

I. mixing a starting material mixture into a substantially homogeneous mass, said starting material mixture being composed of:

A about 87% to 94% by weight of said starting mixture of a first material comprised of about 80% to 95% by weight of silicon carbide particles and about 50% to 20% by weight of a mixture of carbonyl iron particles, nickel-chromium alloy particles, metallic cobalt particles and carbon particles;

B. about 5% to 10% by weight of said starting mixture of a second material comprised of about 85% to 95% by weight of a liquid organic binder and about 5% to 25% by weight of an isocyanate;

C. about 0.2% to 3% by weight of said starting mixture of a third material selected from the group consisting of polystyrene powder, sawdust, wood flour, starch, corn flour and mixtures thereof;



II. placing said homogeneous mass into selected molds and subjecting said filled molds to initial curing conditions sufficient to form self-sustaining members from said homogeneous mass:

III. removing the self-sustaining members from said molds and subjecting said members to further curing conditions sufficient to impart electrical conductivity characteristics to said members; and

IV. sintering the electrically conductive members by gradually heating said members to a temperature in the range of about 1000° to 1600° F. and maintaining said conditions for a period of time sufficient to substantially destroy all organic material within said members and sinter the remaining materials into a uniformly porous body.

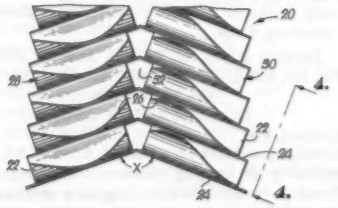
4,040,824
DUAL PATH DRIFT ELIMINATOR STRUCTURE AND METHOD FOR CROSSFLOW COOLING TOWER

Ohler L. Kinney, Jr., Leawood, Kans., assignor to The Marley Company, Mission, Kans.

Continuation-in-part of Ser. No. 526,848, Nov. 25, 1974, abandoned. This application Sept. 20, 1976, Ser. No. 724,417

Int. Cl.[2] B01D *47/00*

U.S. Cl. 55—257 R **19 Claims**



1. A method of removing entrained water particles from a moist airstream traveling along a generally horizontal initial path, comprising the steps of:

initially diverting said moist airstream upwardly relative to said initial path such that a vector representing travel of the moist air along said initial path, and a vector represent-

ing travel of the moist air during said upward and lateral diversion, cooperatively establish a reference plane,

said diversion including the steps of moving said moist air into individual elongated first air cells located in parallel relationship and oriented for causing said upward diversion and defined by walls presenting said first air cells therebetween

thereafter secondarily diverting moist air laterally relative to the path of the air from the first air cells such that a vector representing travel of the moist air during the second lateral diversion thereof is at an angle relative to said reference plane,

said secondary diversion including the steps of moving said moist air from said first air cells into individual elongated second air cells spaced from the air cells disposed in parallel relationship and oriented for causing said second lateral diversion and defined by walls presenting said second air cells therebetween;

permitting the entrained water particles in said airstream to impinge against the walls defining said first and second air cells during said initial and secondary diversions airstream; and

draining the water collected by virtue of said impingement by allowing at least a part of said water to gravitate between said first and second air cells along the space therebetween.

4,040,825

SPECTRAL SENSITIZATION OF PHOTOGRAPHIC MATERIAL WITH NATURAL COLLOIDS CONTAINING SENSITIZING DYE GROUPS

Rolf Steiger, Praroman; Jean-Francois Reber, Marly, both of Switzerland; Aaron David Ezekiel, Sevenoaks, and Geoffrey Ernest Ficken, Ilford, both of England, assignors to Ciba-Geigy AG, Basel, Switzerland

Filed Mar. 11, 1976, Ser. No. 665,981

Claims priority, application United Kingdom, Mar. 18, 1975, 11187/75; Switzerland, Apr. 16, 1975, 4847/75; Feb. 20, 1976, 2100/76

Int. Cl.[2] G03C *1/02, 1/08, 1/16;* **G03G** *5/09*

U.S. Cl. 96—1.7 **7 Claims**

1. Light-sensitive photographic material with a light-sensitive heavy metal compound and a spectral sensitiser, wherein the spectral sensitiser is a compound in which the radicals of a sensitising dyestuff are covalently bonded to amino, imino, hydroxyl, mercapto, carboxylic acid or carboxylic acid amide groups of a natural hydrophilic colloid.

4,040,826

MAGING SYSTEM OF MIGRATION MATERIAL IN SOFTENABLE LAYER

William L. Goffe, Webster; Joseph Mamming, Penfield, and Joan R. Ewing, Rochester, all of N.Y., assignors to Zerox Corporation, Stemford, Conn.

Division of Ser. No. 837,591, June 30, 1969, Pat. No. 4,013,462. This application Apr. 22, 1976, Ser. No. 679,308

Int. Cl.[3] G03G *5/04, 16/00*

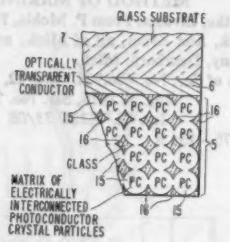
U.S. Cl. 96—1/PS **14 Claims**

1. An imaging method comprising:

(a) providing an imaging member comprising a layer of softenable material having migration marking material dispersed through said softenable material, said softenable material capable of having its resistance to migration of migration marking material decreased sufficiently to allow migration of said material in depth in said softenable material;

(b) applying a migration force to said migration marking material; and

(c) imagewise developing said imaging member by decreasing, in image configuration, the resistance to migration of migration marking material in depth in the layer of softenable material at least sufficient to allow imagewise



migration of migration material at least in depth in said softenable layer.

4,040,827

DEVELOPMENT IMAGING METHODS

Ralph A. Hamaker, Penfield, and George Phillip Carr, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Oct. 29, 1975, Ser. No. 626,689

Int. Cl.[2] G03G *15/10, 13/10;* **B05D** *1/28*

U.S. Cl. 96—1 LY **7 Claims**

1. A method of cyclically developing an electrostatic latent image on a reusable imaging surface comprising

forming an electrostatic latent image on the imaging surfaces,

developing the image with a liquid developer carried in the valleys of a patterned applicator roll comprising a hard, dimensionally stable, patterned surface having a thickness of from about 4 to about 12 mils and having a plurality of lands and valleys, said surface covering a deformable, resilient substrate having from about 0.05 to about one inch thickness and a Shore A hardness of from about 50 to about 90 on a support,

transferring the developing image from the imaging surface to a receiving surface in image configuration, and repeating the cycle at least one additional time.

4,040,828

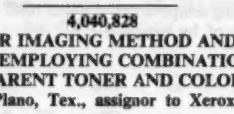
MULTICOLOR IMAGING METHOD AND IMAGED MEMBER EMPLOYING COMBINATIONS OF TRANSPARENT TONER AND COLORANT

Paul F. Evans, Plano, Tex., assignor to Xerox Corporation, Stamford, Conn.

Filed Jan. 6, 1975, Ser. No. 538,826

Int. Cl.[2] G03G *13/01, 9/00, 9/08*

U.S. Cl. 96—1.2 **25 Claims**



1. A method for the reproduction of a multicolored original, comprising:

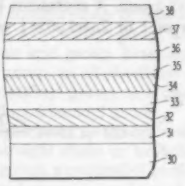
a. forming a first pattern of dry transparent unpigmented toner by developing with said toner a first electrostatic latent image of a first color in said original, transferring said first pattern of said toner to a base member, tackifying said first pattern of said toner, and applying a layer of a first colorant upon said first pattern of said toner; and

b. forming at least a second pattern of dry transparent unpigmented toner by developing a second electrostatic latent image of a second color in said original, transferring said second pattern of said toner to said base member in a position relative to said first pattern which corresponds to the relative positioning of said first and second colors of said original, tackifying said second pattern, and applying a layer of a second colorant upon said second pattern.

4,040,829
MULTILAYER MULTICOLOR PHOTOGRAPHIC MATERIALS

Hideki Ohmatsu, and Hirozo Ueda, both of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed June 4, 1975, Ser. No. 583,816
Claims priority, application Japan, June 4, 1974, 49-63082
Int. Cl.[2] G03C *7/04, 3/00*
U.S. Cl. 96—6 **10 Claims**



1. An incorporated-dye image forming coupler type multilayer photographic material comprising a support having thereon a silver halide emulsion layer which is sensitive to a first wavelength region of the visible spectrum, a silver halide emulsion layer thereon which is sensitive to a second wavelength region of the visible spectrum and thereon a silver halide emulsion layer which is sensitive to a third wavelength region of the visible spectrum, wherein the silver halide emulsion layer which receives first the light at image exposure is positioned so that said layer first receiving said light receives the light through a non-sensitive hydrophilic layer containing a semi-diffusible coupler which can form a dye image having a substantially complementary color to the sensitive wavelength range of said silver halide emulsion layer first receiving light at image exposure and which has a diffusion coefficient of from about 0.25 to 0.80 as defined by the relationship

$$\text{diffusion coefficient} = D_B/D_A$$

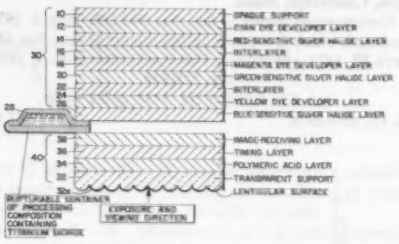
wherein D_A is the color density formed by the color coupler where the color coupler is present in the same layer as silver halide particles developed without imagewise exposure, and D_B is the color density obtained with the color coupler incorporated in a layer which does not contain silver halide particles on a layer which contains silver halide particles developed without image-wise exposure, the components thereof, amounts thereof and production conditions thereof being the same and the development conditions thereof being the same and with the layers being adjusted using a hardening agent so that the coefficient of expansion of the layers in water at a pH of 7.0 to 25° C does not exceed 400%.

4,040,830
PHOTOGRAPHIC PRODUCTS COMPRISING EMBOSSED SUPPORTS

Howard G. Rogers, Weston, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Aug. 27, 1975, Ser. No. 608,062
Int. Cl.[2] G03C *1/72, 1/84, 1/40, 1/76*
U.S. Cl. 96—73 **36 Claims**

1. A photographic product comprising a first support carrying a red-sensitive silver halide emulsion; a green-sensitive silver halide emulsion, and a blue-sensitive silver halide emulsion; said silver halide emulsions having associated therewith, respectively, a cyan image dye-providing substance, a magenta image dye-providing substance and a yellow image dye-providing substance, each said image dye-providing substance being selected from the group consisting of image dyes and image-dye intermediates; an image-receiving layer for receiving image dyes transferred thereto by diffusion as a function of exposure and development of said silver halide emulsion layers; said image-receiving layer being carried by one of said first support and a second support; at least said support carrying said image-receiving layer being transparent, said image-receiving layer being viewable through said transparent support; a rupturable container releasable holding a processing composition adapted, upon distribution between predetermined layers of said product to develop said silver halide emulsions and to effect the formation of a multicolor transfer image in dye in said image-receiving layer, said processing composition also being adapted to provide a permanent laminate including said developed silver halide emulsions and said image-receiving layer; and means providing a light-reflecting layer between said image-receiving layer and said silver halide emulsions to provide a white background for viewing said multicolor transfer image and for masking said developed silver halide emulsions; the outer surface of said transparent support being a non-planar, embossed surface.

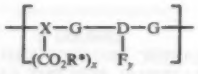


4,040,831
METHOD FOR THE PREPARATION OF RELIEF STRUCTURES

Roland Rubner, Rottenbach u. Forchheim; Wolfgang Kleeberg, and Eberhard Kuhn, both of Erlangen, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed July 24, 1975, Ser. No. 598,829
Claims priority, application Germany, Aug. 2, 1974, 2437348
Int. Cl.[2] G03C *5/00*
U.S. Cl. 96—35.1 **7 Claims**

1. In a method for the preparation of relief structures consisting of highly heat resistant polymers comprising the steps of applying a soluble, photo or radiation-sensitive prepolymer in the form of a film or foil to a substrate, said prepolymer being a poly-addition or polycondensation prepolymer having repeating units of the formula:



wherein,

X and D each comprise a carbocyclic and/or heterocyclic nucleus;

G is selected from the group consisting of amide, urea or urethane linkages;

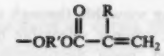
R* is an organic radical containing a photo- or radiation induced di- or polymerizable olefinic double bond; and is a component of ester group CO_2R^*, said group bound to said nucleus in ortho or peri-position to G;

F is a group capable of reacting with the carbonyl group of CO_2R^* to form a cyclic structure upon heating of the prepolymer to liberate R*OH; and wherein F is arranged in ortho- or peri-position to G;

x is 1 or 2; and

y is 0 or 2;

exposing or irradiating the photo or radiation active layer through a negative pattern, dissolving or stripping the unexposed or unirradiated portions and annealing the relief structure obtained; the improvement which comprises using as said R*, a radical represented by the formula:



wherein R is hydrogen or methyl and R is an alkylene group.

4,040,832

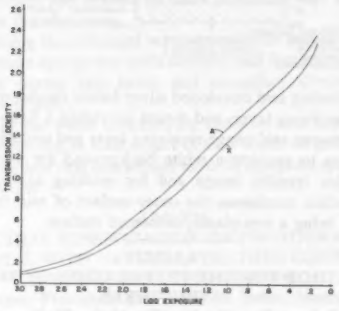
PYRAZOLIDONE TYPE DEVELOPING AGENTS

Stanley M. Bloom, Waban, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

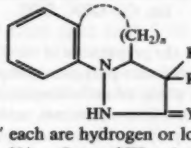
Continuation-in-part of Ser. No. 592,398, July 2, 1975, abandoned, which is a continuation-in-part of Ser. No. 451,740, March 18, 1974, abandoned. This application Sept. 9, 1976, Ser. No. 721,859

Int. Cl.[2] G03C *5/54, 5/30, 5/38, 1/48*

U.S. Cl. 96—29 R **42 Claims**



14. A method of developing a silver halide emulsion which comprises treating an exposed silver halide emulsion layer with an aqueous alkaline processing composition of a silver halide developing agent of the formula:



wherein R and R′ each are hydrogen or lower alkyl having 1 to 4 carbon atoms, Y is =O or =NH and *n* is a positive integer from 1 to 7.

4,040,833

RADIOGRAPHIC PROCESS AND SENSITIVE MATERIAL FOR THE SAME

Masanao Hinata; Haruo Takei; Nobuaki Miyasaka, and Kenji Takahashi, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Apr. 2, 1976, Ser. No. 672,947

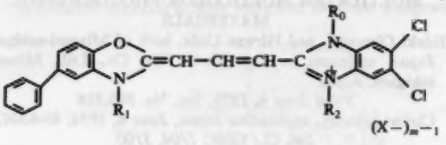
Claims priority, application Japan, Apr. 3, 1975, 50-40577

Int. Cl.[2] G03C *1/92, 1/14*

U.S. Cl. 96—45.1 **14 Claims**

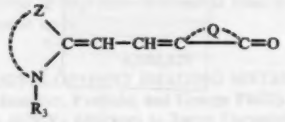
1. In a process for forming radiographic images which comprises exposing a photographic sensitive material comprising a support and at least one silver halide photographic emulsion layer to radiation from a fluorescent intensifying screen to form a latent image and thereafter developing the same, the improvement which comprises the fluorescent intensifying screen having a maximum emission wavelength in the range of about 500 to about 570 nm and a distribution such that at least about ⅓ of the emission energy is at a wavelength of above about 400 nm, and said silver halide photographic emulsion layer contains at least one sensitizing dye represented by formula (I) and at least one sensitizing dye represented by formula (II):

(I)



wherein R_0 represents an alkyl group and R_1 and R_2 each represent an alkyl group, but at least one of R_1 and R_2 represents a sulfoalkyl group, X represents an anion, and m represents an integer of 1 or 2,and $m=1$ when the dye forms an inner salt,

(II)



wherein Z represents the group of atoms necessary to complete a benzoxazole nucleus, R_3 represents an alkyl group, and Q represents the group of atoms necessary to complete a 2-thioimidazolidine-2,4-dione nucleus.

4,040,834

REGENERATION OF PHOTOGRAPHIC PROCESSING SOLUTIONS

Haruhiko Iwano, and Isao Shimamura, both of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Feb. 18, 1976, Ser. No. 658,963

Claims priority, application Japan, Feb. 18, 1975, 50-20196

Int. Cl.[2] G03C *5/26, 5/32;* **B01D** *13/00*

U.S. Cl. 96—50 A **8 Claims**

1. In photographic processing involving image intensification of a photographic element comprising a substrate and at least one layer containing image-wise distributed silver in the presence of a reducing agent by application of a cobalt (III) complex having ligands selected from the group consisting of ammine, nitrite, nitrate, azide, chloride, thiocyanate, isocyanate and H_2O; a method for reusing the intensifier solution containing the cobalt (III) complex characterized by:

subjecting used intensifying solution to reverse osmosis whereby the cobalt (III) complex is concentrated and unfavorable contaminants are removed, and

adjusting the pH to about 4 to 10, said solution thereby being regenerated for further intensifying.

4,040,835

TWO-EQUIVALENT MAGENTA COUPLERS WITH AMIDO COUPLING-OFF GROUPS

Atsuaki Arai; Keisuke Shiba; Minoru Yamada; Nobuo Furutachi, and Kotaro Nakamura, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed June 27, 1975, Ser. No. 590,998

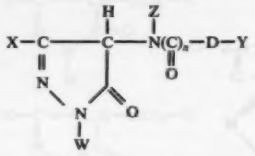
Claims priority, application Japan, June 27, 1974, 49-73673

Int. Cl.[2] G03C *7/00, 1/40*

U.S. Cl. 96—56.5 **5 Claims**

3. The process of forming color images which comprises processing an exposed color photographic material comprising a support having thereon at least one silver halide emulsion layer with a color developer containing a primary aromatic amino color developing agent in the presence of a two-equivalent magenta coupler represented by the general formulae (II) to (V):

(II)

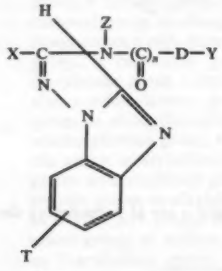


wherein W represents a hydrogen atom; or has up to 40 carbon atoms and represents a straight chain or branched chain alkyl group, an alkenyl group, a cycloalkyl group, an aralkyl group, a cycloakenyl group, an aryl group, heterocyclic group, an acyl group, a thioacyl group, an alkylsulfonyl group, an arylsulfonyl group, an alkylsulfinyl group, an arylsulfinyl group, a carbamyl group, or a thiocarbamoyl group;

X represents a hydrogen atom; or has up to 40 carbon atoms and represents a straight chain or branched chain alkyl group, an alkenyl group, a cycloalkyl group, an aralkenyl group, a cycloalkenyl group, an aryl group, a heterocyclic group, an alkoxycarbonyl group, an aryloxycarbonyl group, an aralkyloxycarbonyl group, an alkoxy group, an aryloxy group, an alkylthio group, an arylthio group, a carboxyl group, an acylamino group, a diacylamino group, an N-alkylacylamino group, an N-arylacylamino group, a ureido group, a thioureido group, an alkoxycarbamido group, an aryloxycarbamido group, an alkythiocarbamido group, an arylthiocarbamido group, an anilino group, an alkylamino group, a cycloamino group, an alkycarbonyl group, an arylcarbonyl group, a sulfoamido group, a carbamoyl group, a sulfamoyl group, a guanidino group, a cyano group, an acyloxy group, a sulfonyloxy group, a hydroxyl group, a mercapto group, a halogen atom, or a sulfo group; Z represents a hydrogen atom, a alkyl group, an aryl group, or a heterocyclic group; and

D represents an oxygen atom, a sulfur atom or a —NR— group; R of the —NR— group represents hydrogen atom, an alkyl group or an aryl group; Y represents an alkyl group, an aryl group or a heterocyclic group; *n* is 1 or 2

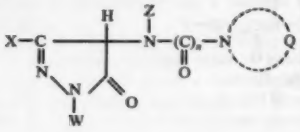
(III)



wherein X, Y, Z, D, and *n* are each as defined hereinbefore, and,

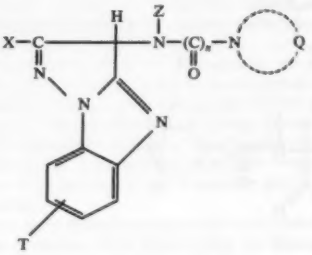
T represents a hydrogen atom; or has up to 40 carbon atoms and represents a straight chain or branched chain alkyl group, an alkenyl group, a cycloalkyl group, an aralkyl group, a cycloalkenyl group, an aryl group, a heterocyclic group, a cyano group, an alkoxy group, an alkoxycarbonyl group, a halogen atom, an aryloxy group, a carboxyl group, an aryloxycarbonyl group, an acyloxy group, an alkylcarbonyl group, an arylcarbonyl group, an alkylthiocarbonyl group, an arylthiocarbonyl group, a sulfo group, a sulfomoyl group, a carbamoyl group, an acylamino group, a diacylamino group, a ureido group, a thioureido group, an alkoxycarbamido group, an aryloxycarbamido group, an alkythiocarbamido group, an arythiocarbamido group, a sulfonamido group, an alkysulfonyloxy group, an arylsulfonyloxy group, an arylsulfonyl group, an alkylsulfonyl group, an arylthio group, an alkylthio group, an alkylsulfinyl group, an arysulfinyl group, an alkylamino group, a dialkylamino group, an anilino group, an N-arylanilino group, a N-alkylanilino group, an N-acylanilino group, a hydroxyl group, or a mercapto group;

(IV)



wherein Q of the —N⟨ ⟩Q residue represents a non-metal atomic group necessary for forming a 5-membered or 6-membered nitrogen-containing heterocyclic ring and wherein W, X, Z, —N⟨ ⟩Q, and *n* are each as defined hereinbefore;

(V)

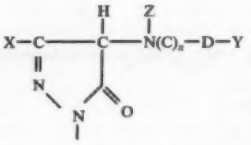


wherein X, Z, T, —N⟨ ⟩Q, and *n* are each as defined hereinbefore; or represented by the general formulae (VI*a*) to (VI*d*)

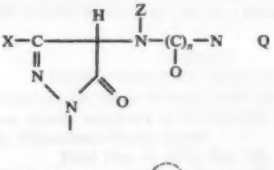
Cp — W′ — Cp (VI*a*)

wherein W′ represents a divalent moiety of the groups hereinbefore described for W; and Cp, which may be the same or different, each represents a moiety of the general formulae (II*a*) and (IV*a*)

(IIa)



(IVa)

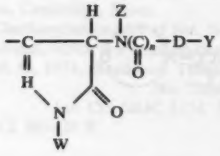


wherein X, Y, Z, D, —N⟨ ⟩Q and *n* are as hereinbefore described

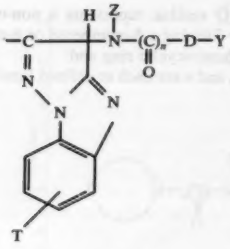
Cp — X′ — Cp (VI*b*)

wherein X′ represents a divalent moiety of the groups hereinbefore described for X; and Cp, which may be the same or

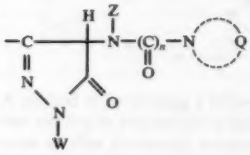
different, each represents a moiety of the formula (II*b*), (III*a*), (IV*b*) or (V*a*)



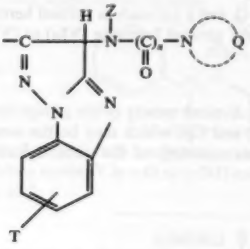
(IIb)



(IIIa)



(IVb)

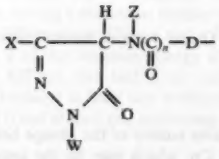


(Va)

wherein T, W, Y, Z, D, —N⬭Q and *n* are as hereinbefore described;

$$Cp - Y' - Cp \qquad \text{(VIc)}$$

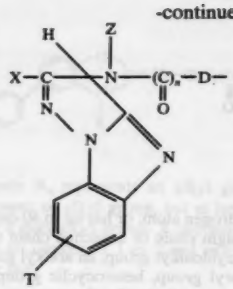
wherein Y' represents a divalent moiety of the groups hereinbefore described for Y; and Cp, which may be the same or different, each represents a moiety of formula (II*c*) or (III*b*)



(IIc)

(IIIb)

-continued

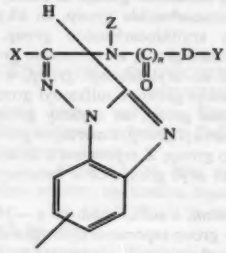


wherein T, W, X, Z, D, —N⬭Q, and *n* are as hereinbefore described;

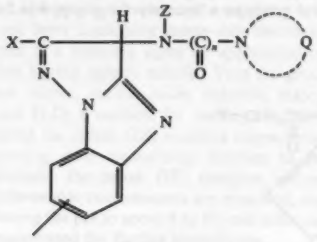
$$Cp - T' - Cp \qquad \text{(VId)}$$

wherein T' represents a divalent moiety of the groups hereinbefore described for T; and Cp, which may be the same or different, each represents a moiety of the formula (III*c*) or (V*b*)

(IIIc)



(Vb)



wherein X, Y, Z, D, —N⬭Q, and *n* are as hereinbefore described.

4,040,836

SILVER HALIDE EMULSION CONTAINING TWO-EQUIVALENT COUPLER

Atsuaki Arai; Kotaro Nakamura; Minoru Yamada, and Nobuo Furutachi, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

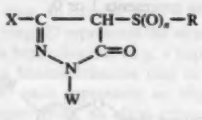
Filed July 18, 1975, Ser. No. 597,280

Claims priority, application Japan, July 18, 1974, 49-82415

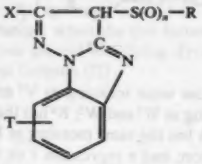
Int. Cl.[2] G03C *7/00, 1/40*

U.S. Cl. 96—56.5 **10 Claims**

1. A method of forming images which comprises developing a silver halide photographic light-sensitive material in the presence of a photographic two-equivalent magenta coupler, wherein said magenta coupler is represented by the following general formula (II) or (III)



(II)



(III)

wherein

W represents a hydrogen atom; or has up to 35 carbon atoms and represents a straight chain or branched chain alkyl group, an alkenyl group, a cycloalkyl group, an aralkyl group or a cycloalkenyl group, in which each of these groups can be substituted with one or more of a halogen atom, a nitro group, a cyano group, an aryl group, an alkoxy group, an aryloxy group, a carboxy group, an alkylcarbonyl group, an arylcarbonyl group, an alkoxycarbonyl group, an aryloxycarbonyl group, a sulfo group, an acyloxy group, a sulfamoyl group, a carbamoyl group, an acylamino group, a diacylamino group, an ureido group, a thioureido group, an alkoxycarbonylamino group, an aryloxycarbonylamino group, an alkoxythiocarbonylamino group, an aryloxythiocarbonylamino group, a sulfonamido group, a heterocyclic group, an arylsulfonyl group, an alkylsulfonyl group, an arylsulfonyloxy group, an alkylsulfonyloxy group, an arylthio group, an alkylthio group, an alkylsulfinyl group, an arylsulfinyl group, an alkylamino group, a dialkylamino group, an anilino group, an N-arylanilino group, an N-alkylanilino group, an N-acylanilino group, a hydroxy group and a mercapto group as substituents; an aryl group in which the aryl group can be substituted with one or more of a halogen atom, an alkyl group, an alkenyl group, a cycloalkyl group, an aralkyl group, a cycloalkenyl group, a nitro group, a cyano group, an aryl group, an alkoxy group, an aryloxy group, a carboxy group, an alkylcarbonyl group, an arylcarbonyl group, an alkoxycarbonyl group, an aryloxycarbonyl group, a sulfo group, an acyloxy group, a sulfamoyl group, a carbamoyl group, an acylamino group, a diacylamino group, a ureido group, a thioureido group, an alkoxycarbonylamino group, an aryloxycarbonylamino group, an alkoxythiocarbonylamino group, an aryloxythiocarbonylamino group, a sulfonamido group, a heterocyclic group, an arylsulfonyloxy group, an alkylsulfonyloxy group, an arylsulfonyl group, an alkylsulfonyl group, an arylthio group, an alkylthio group, an alkylsulfinyl group, an arylsulfinyl group, an alkylamino group, a dialkylamino group, an anilino group, an N-alkylanilino group, an N-acylanilino group, a hydroxy group and a mercapto group as substituents; a heterocyclic group in which the heterocyclic group can be substituted with one or more of the substituents described above for the aryl group for W; an acyl group; a thioacyl group; an alkylsulfonyl group; an arylsulfonyl group; an alkylsulfinyl group; an arylsulfinyl group; a carbamoyl group; or a thiocarbamoyl group;

X represents a hydrogen atom; or has up to 35 carbon atoms and represents a straight chain or branched chain alkyl group, an alkenyl group, a cycloalkyl group, an aralkyl group, a cycloalkenyl group, an aryl group, or a heterocyclic group, in which each of these groups can be substituted with onr or more of the respective substituents as described above for W; an alkoxycarbonyl group; an aryloxycarbonyl group; an aralkyloxycarbonyl group; an alkoxy group; an aryloxy group; an alkylthio group; an arylthio group; a carboxy group; an acylamino group; a diacylamino group; an N-alkylacylamino group; an N-arylacylamino group; a ureido group; a thioureido group; an alkoxycarbonylamino group; aryloxycarbonylamino group; an alkoxythiocarbonylamino group; an aryloxythiocarbonylamino group; an anilino group; an alkylamino group; a cycloamino group; an alkylcarbonyl group; an arylcarbonyl group; a sulfonamido group; a carbamoyl group; a sulfamoyl group; a guanidino group; a cyano group; an acyloxy group; a sulfonyloxy group; a hydroxy group; a mercapto group; a halogen atom; or a sulfo group;

T represents a hydrogen atom; or has up to 35 carbon atoms and represents a straight chain or branched chain alkyl group, an alkenyl group, a cycloalkyl group, an aralkyl group, a cycloalkenyl group, an aryl group, or a heterocyclic group, in which each of these groups can be substituted with one or more of the respective substituents as described above for W; a cyano group; an alkoxy group; an aryloxy group; a halogen atom; a carboxy group; an alkoxycarbonyl group; an aryloxycarbonyl group; an acyloxy group; an alkylcarbonyl group; an arylcarbonyl group; an alkylthiocarbonyl group; an arylthiocarbonyl group; a sulfo group; a sulfamoyl group; a carbamoyl group; an acylamino group; a diacyclamino group; a ureido group; a thioureido group; an alkoxycarbonylamino group; an aryloxycarbonylamino group; an alkoxythiocarbonylamino group; an aryloxythiocarbonylamino group; a sulfonamide group; an alkylsulfonyloxy group; an arylsulfonyloxy group; an arylsulfonyl group; an alkylsulfonyl group; an arylthio group; an alkylthio group; an alkylsulfinyl group; an arylsulfinyl group; an alkylamino group; a dialkylamino group; an anilino group; an N-alkylanilino group; an N-arylanilino group; an N-acylanilino group; a hydroxy group; or a mercapto group;

R has up to 40 carbon atoms and represents a straight chain or branched chain alkyl group, an alkenyl group, or an aralkyl group, in which each of these groups can be substituted with one or more of a halogen atom, a nitro group, a carboxy group, an alkoxy group, an alkylamido group, an arylamido group, a sulfamoyl group, a carbamoyl group, a substituted amino group, an alkylthio group, and an arylthio group as substituents; an aryl group in which the aryl group can be substituted with one or more of a halogen atom, an alkyl group having 1 to 20 carbon atoms, an aralkyl group, an alkenyl group, an alkyloxy group, an aryloxy group, a nitro group, a cyano group, a carboxy group, an alkyloxycarbonyl group, an aryloxycarbonyl group, an acyloxy group, an alkylamido group, an arylamido group, a diacylamino group, a sulfamoyl group, a sulfonamido group, a ureido group, a thioureido group, an alkoxycarbonylamino group, an aryloxycarbonylamino group, an alkoxythiocarbonylamino group, an aryloxythiocarbonylamino group, a carbamoyl group, a substituted amino group, an alkylthio group, an arylthio group, a sulfonyl group and a carbonyl group as substituents; and a heterocyclic group in which the heterocyclic group can be substituted with one or more of the substituents as described above for the aryl group for R; and *n* is 1 or 2.

4,040,837

PHOTOGRAPHIC BLEACH-FIXER

Kenro Sakamoto; Isamu Fushiki, and Sigeharu Koboshi, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Nihonbashi-Muro, Japan

Filed Dec. 2, 1975, Ser. No. 636,948

Claims priority, application Japan, Dec. 5, 1974, 49-140322

Int. Cl.[2] G03C *5/32*

U.S. Cl. 96—60 BF **5 Claims**

1. A photographic bleach-fixer comprising per liter 0.1 to 1.5 moles of an organometallic complex salt of an organic acid, selected from the group consisting of ethylenediaminetetraacetic acid, nitrilotriacetic acid, diethylenetriaminepentaacetic

acid, 1,2-cyclohexanediaminetetraacetic acid, glycol ether diaminetetraacetic acid, oxybis-(ethyleneoxyethylenenitrilo) tetraacetic acid, oxalic acid and citric acid, coordinated with an ion selected from the group consisting of Iron (III), Cobalt (III) and Copper (II) ion, 0.2 to 2.0 moles of a silver halide-fixing agent, and 0.5 to 7.0 moles of a halide of the general formula:

$$A - X$$

wherein A is selected from the group consisting of hydrogen, lithium, sodium, potassium and ammonium; and X is selected from the group consisting of bromine and iodine.

4,040,838

PROCESSING COLOR PHOTOGRAPHIC MATERIALS

Seiya Yamaguchi, Minami-ashigara, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Mar. 5, 1976, Ser. No. 664,225
Claims priority, application Japan, Mar. 5, 1975, 50-27276
Int. Cl.[2] G03C *5/32*
U.S. Cl. 96—60 R **15 Claims**

1. A process of bleaching or blixing silver halide color photographic materials which comprises processing exposed and color developed photographic materials in a bleach solution or a blix solution having a pH of from 5.0 to 7.5 containing an iron III, cobalt III or copper II complex salt of an organic acid, a water soluble ammonium compound and a magnesium compound selected from the group consisting of magnesium acetate, magnesium bromide, magnesium chloride, magnesium sulfate, magnesium carbonate, magnesium citrate, magnesium hydroxide, magnesium lactate, magnesium nitrate, magnesium oxalate, magnesium oxide, magnesium perchlorate, magnesium secondary phosphate, magnesium tertiary phosphate, magnesium silicate, magnesium bromate, magnesium sulfite, or magnesium chromate.

4,040,839

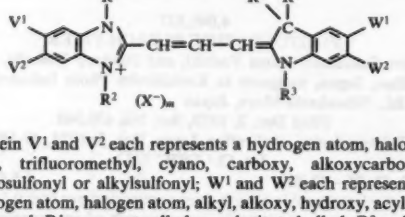
DIRECT-POSITIVE PROCESS UTILIZING A SUPERSENSITIZED SILVER HALIDE EMULSION

Junichi Matsuyama; Masanao Hinata, and Akira Sato, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed May 19, 1976, Ser. No. 687,819
Claims priority, application Japan, May 19, 1975, 50-59479
Int. Cl.[2] G03C *5/24, 1/28*
U.S. Cl. 96—64 **8 Claims**

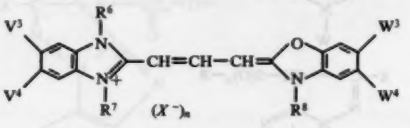
1. A method of obtaining a direct positive image, which comprises image-wise exposing a layer of an internal latent image silver halide emulsion, and then surface developing in contact with a fogging agent, wherein the internal latent image silver halide photographic emulsion yields a direct positive image on surface development in contact with said fogging agent and contains at least one sensitizing dye of the following general formula (I) and at least one sensitizing dye of the following general formula (II) and/or (III), in an amount effective to achieve supersensitization:

(I)



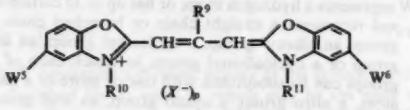
wherein V^1 and V^2 each represents a hydrogen atom, halogen atom, trifluoromethyl, cyano, carboxy, alkoxycarbonyl, aminosulfonyl or alkylsulfonyl; W^1 and W^2 each represents a hydrogen atom, halogen atom, alkyl, alkoxy, hydroxy, acyloxy or phenyl; R^1 represents alkyl or substituted alkyl; R^2 and R^3 each represents alkyl or substituted alkyl, and at least one of R^2 and R^3 represents substituted alkyl containing a carboxy or sulfo radical; R^4 and R^5 each has the same meaning as R^1; X^- represents an acid anion; and m represents 1 or 0;

(II)



wherein V^3 and V^4 each has the same meaning as V^1 and V^2; W^3 and W^4 each has the meaning as W^1 and W^2; R^6 has the same meaning as R^1; R^7 and R^8 each has the same meaning as R^2 and R^3; X^- represents an acid anion; and n represents 1 or 0;

(III)



wherein W^5 and W^6 each has the same meaning as W^3 and W^4; R^{10} and R^{11} each has the same meaning as R^2 and R^3; R^9 represents an alkyl group; X^- represents an acid anion; and p represents 0 or 1.

4,040,840

PHOTOGRAPHIC SENSITIVE ELEMENTS HAVING DYED LAYERS

Masatoshi Sugiyama, and Akira Ogawa, both of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Nov. 23, 1976, Ser. No. 744,353
Claims priority, application Japan, Nov. 26, 1975, 50-142580
Int. Cl.[2] G03C *1/84*
U.S. Cl. 96—84 A **12 Claims**

1. A silver halide photographic light-sensitive element comprising a support, at least one silver halide light-sensitive emulsion layer and at least one hydrophilic colloid layer, wherein said hydrophilic colloid layer comprises at least one merocyanine dye having an isoxazole nucleus, a pyrazoline-5-one nucleus and at least one acid group in the dye molecule, the 3-position of the isoxazole nucleus being linked through a methine chain to the 4-position of the pyrazoline-b **5-one** nucleus, and a basic polymer having tertiary- or quaternary-nitrogen containing basic residues on the main chain or on the side chains thereof.

4,040,841

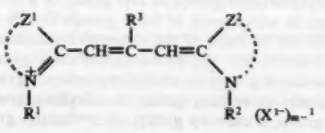
SILVER HALIDE PHOTOGRAPHIC EMULSION

Masanao Hinata; Haruo Takei; Akira Sato; Tadashi Ikeda, and Atsuo Iwamoto, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Aug. 6, 1975, Ser. No. 602,508
Claims priority, application Japan, Aug. 9, 1974, 49-91369
Int. Cl.[2] G03C *1/14*
U.S. Cl. 96—126 **11 Claims**

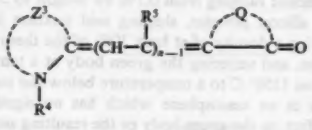
1. A silver halide photographic emulsion containing, in supersensitizing amounts, the combination of at least one sensitizing dye represented by the following general formula (I)

(I)



wherein Z^1 represents the atoms necessary to form a benzimidazole ring, an oxazole ring, a benzoxazole ring or a naphthoxazole ring; Z^2 represents the atoms necessary to form a thiazole ring, a benzothiazole ring, a naphthothiazole ring, a selenazole ring, a benzoselenazole ring or a naphthoselenazole ring; R^1 and R^2 each represents an aliphatic group; R^3 represents a hydrogen atom, an alkyl group, an aryl group or an aralkyl group; X^1 represents an acid anion; *m* represents 1 or 2, and *m* represents 1 when the dye forms an intramolecular salt; and at least one second sensitizing dye represented by the following general formula (II)

(II)



wherein Z^3 represents the atoms necessary to complete a benzoxazole, ring; Q represents the atoms necessary to form a thiohydantoin ring; R^4 represents an aliphatic group; R^5 represents a hydrogen atom, an alkyl group, an aryl group or an aralkyl group; and *n* is 2.

4,040,842

RUST PREVENTING COATING COMPOSITION

Hiroshi Makishima; Minoru Hosoda, both of Yokohama; Eiichi Kasiwagi, Fujisawa, and Toshiharu Hayashi, Yokohama, all of Japan, assignors to Dai Nippon Tokyo Co., Ltd., Osaka, Japan

Continuation of Ser. No. 557,382, March 11, 1975, abandoned. This application Oct. 21, 1976, Ser. No. 734,596

Claims priority, application Japan, July 23, 1974, 49-84504

Int. Cl.[2] C09D *5/10*

U.S. Cl. 106—1 **9 Claims**

1. In a rust preventive aqueous coating composition having an extended pot life and consisting essentially of a major amount of, and a minor amount of zinc powder at least one silicate selected from the group consisting of alkali metal silicates and ammonium silicate; the improvement comprising 0.0001 to 1% by weight of at least one salt selected from the group consisting of molybdates, tungstates, phosphomolybdates and phosphotungstates.

4,040,843

FLAME-RETARDANT REGENERATED CELLULOSE FILAMENTS CONTAINING OLIGOMERIC PHOSPHONITRILIC COMPOUNDS

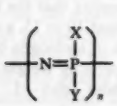
Borivoj Richard Franko-Filipasic, Morrisville, Pa., and John Francis Start, Mercerville, N.J., assignors to FMC Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 428,111, Dec. 26, 1973, abandoned, which is a division of Ser. No. 230,955, March 1, 1972, Pat. No. 3,836,599. This application Feb. 9, 1976, Ser. No. 656,681

Int. Cl.[2] C08L *1/08, 1/24;* D01F *2/08;* D06M *13/32, 13/44*

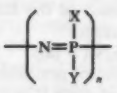
U.S. Cl. 106—15 FP **9 Claims**

1. Regenerated cellulose filaments and filamentary articles, said filaments having dispersed therein a flame-retardant amount of a substantially water-insoluble viscous phosphorus-containing oligomeric flame-retardant fluid made by heating together at a temperature of about 50 to 180° C for at least 2 hours up to 36 hours (a) phosphoric anhydride with (b) a fluid phosphonitrilic ester having the general formula:



in which *n* is at least 3 and wherein X and Y represent the same or different —OR groups wherein R is an alkyl or alkenyl radical having 1 to 12 carbon atoms, at a mole ratio of 1 mole of (a) to 10 to 20 moles of (b), wherein moles of (b) are based on a monomeric unit of the ester general formula.

5. The method of preparing flame-retardant regenerated cellulose filaments which combines mixing viscose and a flame-retardant amount of a substantially water-insoluble viscous phosphorus-containing oligomeric flame-retardant fluid made by heating together at a temperature of about 50° to 180° C for at least 2 hours up to 36 hours (a) phosphoric anhydride with (b) a fluid phosphonitrilic ester having the general formula:



in which *n* is at least 3 and wherein X and Y represent the same or different —OR groups wherein R is an alkyl or alkenyl radical having 1 to 12 carbon atoms, at a mole ratio of 1 mole of (a) to 10 to 20 moles of (b), wherein moles of (b) are based on a monomeric unit of the ester general formula, and, thereafter, spinning the mixture into filaments.

4,040,844

PORCELAIN TOOTH AND METHOD OF MANUFACTURE

Rafael Gnecco, 3820 Waldo Ave., Bronx, N.Y. 10463

Filed June 10, 1975, Ser. No. 585,529

Int. Cl.[2] A61C *13/08;* C09K *3/00*

U.S. Cl. 106—35 **5 Claims**

1. A method of making a porcelain tooth structure, comprising preparing a paste of powder-form porcelain and an adhesive material, in an amount sufficient to form a cohesive mass of said porcelain, forming said paste into the general shape of a desired, finished porcelain tooth and drying said formed paste to produce an unbaked, dry, coherent tooth structure,

said adhesive in at least part of said tooth structure being a water-soluble adhesive treated with an agent during the formation of the paste to render said adhesive water-resistant after drying, said agent entering into a physico-chemical reaction with said adhesive, and said adhesive being volatilizable below vitrification temperature and leaving no discoloring effect,

and said porcelain being compatible with standard commercial porcelains so that when standard commercial porcelain is added to the structure and the entire structure is fired, a monolithic structure results.

4,040,845

CERAMIC COMPOSITION AND CRUCIBLES AND MOLDS FORMED THEREFROM

David W. Richerson, and Donald R. Schuyler, II, both of Tempe, Ariz., assignors to The Garrett Corporation, Los Angeles, Calif.

Filed Mar. 4, 1976, Ser. No. 663,641

Int. Cl.[2] B28B *7/34;* C04B *35/50*

U.S. Cl. 106—38.9 **10 Claims**

1. A ceramic composition for use in constructing crucibles and molds used in reactive metal casting consisting essentially of a mixture of a major amount of yttrium oxide and a minor amount of heavy rare earth mixed oxides consisting essentially of dysprosium oxide, ytterbium oxide, erbium oxide, gadolinium oxide, terbium oxide, holmium oxide, thulium oxide and lutetium oxide.

4,040,846

OPTICAL FLUOROPHOSPHATE GLASS AND PROCESS OF MAKING SAME

Heinz Broemer, Hermannstein, and Norbert Meinert, Bielhausen, both of Germany, assignors to Ernst Leitz G.m.b.H., Wetzlar, Germany

Filed Mar. 17, 1976, Ser. No. 667,836
Claims priority, application Germany, Mar. 29, 1975, 2514017
Int. Cl.[2] C03C *3/16, 3/18*
U.S. Cl. 106—47 Q 24 Claims

1. An optical fluorophosphate glass of a high positive anomalous partial dispersion $\Delta\nu_e$ within the range of from about +10.0 to about +21.0, a relatively high index of refraction n_e within the range of from about 1.47 to about 1.54 and an Abbe number ν_e within the range of from about 84.1 to about 51.0, said glass being composed of the following components in approximate weight percent:

OXIDE COMPONENTS (a):
- 9% to 20% of phosphorus pentoxide (P_2O_5)
- 0% to 4% of cadmium oxide (CdO)
- 0% to 15% of lead monoxide (PbO)
- 0% to 14% of antimony trioxide (Sb_2O_3)
- 0% to 10% of lanthanum oxide (La_2O_3)
- 0% to 3% of germanium dioxide (GeO_2)
- 0% to 6% of titanium dioxide (TiO_2)
- 0% to 7% of niobium pentoxide (Nb_2O_5)
- 0% to 7% of molybdenum trioxide (MoO_3)
- 0% to 9% of tungsten trioxide (WO_3);

FLUORIDE COMPONENTS (b):
- 3% to 7% of magnesium fluoride (MgF_2)
- 5% to 19% of calcium fluoride (CaF_2)
- 0% to 11% of strontium fluoride (SrF_2)
- 0% to 34% of barium fluoride (BaF_2)
- 0% to 4% of cadmium fluoride (CdF_2)
- 21% to 23% of aluminum fluoride (AlF_3)
- 0% to 10% of bismuth trifluoride (BiF_3);

COMPLEX FLUORIDE COMPONENTS (c):
- 0% to 6% of potassium hydrogen fluoride (KHF_2)
- 0% to 15% of potassium titanium hexafluoride (K_2TiF_6)
- 0% to 24% of barium titanium hexafluoride ($BaTiF_6$);

the calculated phosphorus content of said glass being between about 4.1% and about 8.4%, by weight, the calculated fluorine content thereof being between about 30.8% and about 37.6%, by weight, and the ratio of fluorine to phosphorus (F/P) being between about 3.7 and about 8.2.

4,040,847

TEMPERATURE STABLE FIBROUS INSULATION COMPOSITION AND "WET" PACKAGE FORMED THEREOF

William Clyde Miiller, Denver, Colo., assignor to Johns-Manville Corporation, Denver, Colo.

Filed Apr. 14, 1976, Ser. No. 676,776
Int. Cl.[2] C04B *35/80*
U.S. Cl. 106—69 7 Claims

1. A temperature stable refractory fiber insulation composition which comprises a binder impregnated refractory fiber blanket, said binder comprising a binder system consisting essentially of 25% to 95% by volume of an aqueous suspension of colloidal silica containing 15 to 30 weight percent solids, wherein the silica is in the form of particles having a mean particle diameter of not greater than 10 nanometers; 5 to 12 volume percent ethylene glycol; and up to 70% added water.

4,040,848

POLYCRYSTALLINE SILICON ARTICLES CONTAINING BORON BY SINTERING

Charles D. Greskovich, and Joseph H. Rosolowski, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jan. 6, 1976, Ser. No. 646,969
Int. Cl.[2] C01B *33/00, 35/02;* C04B *35/16*
U.S. Cl. 106—73.5 9 Claims

1. A process for producing a polycrystalline sintered body of silicon which comprises forming a particulate mixture of silicon powder and boron, said silicon powder and boron having an average particle size less than 3 microns, said boron being present in an amount ranging from 0.1% by weight to 5% by weight of said silicon powder, shaping said mixture into a green body having a density of at least 30% of the theoretical density of silicon, and sintering the green body at a temperature ranging from 1250° C to a temperature below the melting point of silicon in an atmosphere which has no significant deteriorating effect on the green body or the resulting sintered body to produce a sintered body having a density of at least 60% of the theoretical density of silicon, and sintering densifying said green body in an amount of at least 2%.

4,040,849

POLYCRYSTALLINE SILICON ARTICLES BY SINTERING

Charles D. Greskovich, and Joseph H. Rosolowski, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jan. 6, 1976, Ser. No. 646,968
Int. Cl.[2] C01B *33/02;* C04B *35/16*
U.S. Cl. 106—73.5 8 Claims

1. A process for producing a polycrystalline sintered body of silicon which comprises shaping silicon powder having an average particle size less than 0.1 micron into a green body having a density of at least 30% of the theoretical density of silicon, said powder having a structure ranging from amorphous to crystalline, and sintering the green body at a temperature ranging from 1250° C to a temperature below the melting point of silicon in an atmosphere which has no significant deteriorating effect on the green body or the resulted sintered body to produce a sintered body having a density of at least 60% of the theoretical density of silicon, said sintering densifying said green body in an amount of at least 2%.

4,040,850

PRODUCTION OF POROUS GYPSUM MOLDINGS

Hans Kyri, Cologne; Karl Bründle, Leverkusen; Martin Müller, and Heinrich Heine, both of Krefeld, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Aug. 14, 1975, Ser. No. 604,856
Claims priority, application Germany, Sept. 3, 1974, 2442021
Int. Cl.[2] C04B *11/00*
U.S. Cl. 106—87 10 Claims

1. In the production of a gypsum based porous body of high strength by foaming a gypsum-water mixture, the improvement which comprises including in said mixture of water and calcium sulfate about 0.1 to 1 part of a water-soluble aluminum salt per 100 parts by weight of gypsum, at least about 0.1% by weight of calcium oxide or the equivalent amount of calcium hydroxide in such a quantity that the final mixture has a pH-value in the range of about 10 to 13, a decomposition catalyst, and about 0.5 to 5 parts of hydrogen peroxide, expressed as a 35% solution, per 100 parts by weight of mixture, the ratio of solids to liquid being about 1:0.4 – 1.

4,040,851

COTTON-CEMENT ARTICLES

B. Randall Ziegler, Freehold, N.J., assignor to GAF Corporation, New York, N.Y.

Filed May 30, 1975, Ser. No. 582,165
Int. Cl.[2] C04B 7/353
U.S. Cl. 106—93 22 Claims

1. A fiber reinforced cementitious hydrated reaction product of curing a reaction mixture comprising on a dry basis:
a. between about 25 and about 75 wt. % Portland cement;
b. between about 1 and about 15 wt. % cotton fiber;
c. between about 3 and about 30 wt. % inorganic filler; and
d. at least sufficient water to supply water of hydration.

4,040,852

LIGHTWEIGHT AGGREGATE

Dennis A. Jones, Vandalia, Ohio, assignor to Amax Resource Recovery Systems, Inc., Atlanta, Ga.

Continuation of Ser. No. 564,878, April 4, 1975, abandoned, which is a division of Ser. No. 489,905, July 19, 1974, Pat. No. 3,961,973. This application June 17, 1976, Ser. No. 697,276
The portion of the term of this patent subsequent to June 8, 1993, has been disclaimed.
Int. Cl.[2] C04B 7/02
U.S. Cl. 106—97 1 Claim

1. The process of producing a concrete mix for the manufacture of lightweight structural concrete and the like comprising the steps of:
1. selecting dry bottom ash formed as a by-product of burning pulverized coal in a suspended state in a dry bottom furnace, said ash being essentially free of fly ash and other excess fine particles so that no more than 25 percent passes a 100-mesh screen, and having less than 1 percent iron pyrite by weight and not more than 5 percent sulfur trioxide by weight; and
2. mixing said selected dry bottom ash with Portland cement as the principal lightweight aggregate component of the resulting concrete mix.

4,040,853

PROCESS FOR THE PREPARATION OF RAW MIX FOR THE PRODUCTION OF CEMENT AND SULPHURIC ACID

Walter Binder, Linz; Josef Hutter, Linz-Dornach; Heinrich Stich, Ottensheim; Kurt Ruckensteiner, Leonding, all of Austria; Josef Tines, deceased, late of Linz, Austria; by Antonie Tines, legal representative, Altmunster, and by Heide Schwarz, legal representative, Linz, both of Austria, assignors to Chemie Linz Aktiengesellschaft, Linz, Austria

Filed Dec. 16, 1975, Ser. No. 641,589
Claims priority, application Germany, Dec. 23, 1974, 2461133
Int. Cl.[2] C04B 7/04
U.S. Cl. 106—103 11 Claims

1. A process for the preparation of a raw mix suitable for use in the production of cement and sulphuric acid by the cement-sulphuric acid process, which comprises separately grinding coke to a degree of comminution such that 25 to 40% by weight of the ground coke has a grain size of less than 60μ, 8 to 15% by weight of the ground coke has a grain size of 60 to 90μ, and 45 to 70% by weight of the ground coke has a grain size of greater than 90μ, and mixing the ground coke with a ground mixture of calcium sulphate and remaining additives.

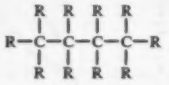
4,040,854

METHODS OF USING CEMENTING COMPOSITIONS HAVING IMPROVED FLOW PROPERTIES, CONTAINING PHOSPHONOBUTANE TRICARBOXYLIC ACID

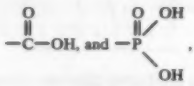
Leonard J. Persinski, Pittsburgh, Pa.; Fred David Martin, Socorro, N. Mex., and Sally Lee Adams, Pittsburgh, Pa., assignors to Calgon Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 553,775, Feb. 27, 1975, Pat. No. 3,964,921. This application Apr. 14, 1976, Ser. No. 676,844
The portion of the term of this patent subsequent to June 22, 1993, has been disclaimed.
Int. Cl.[2] C04B 7/02, 7/35
U.S. Cl. 106—90 6 Claims

1. In a method of subjecting an aqueous hydraulic cement slurry to flow for the purpose of handling or transporting said slurry, the improvement comprising adding to said slurry, prior to subjecting said slurry to flow, from about 0.01 to about 5.0 percent by weight, based on weight of hydraulic cement on a dry basis, of a phosphonobutane tricarboxylic acid additive of the following formula:



wherein R is independently selected from —H,



provided that three R groups are

and one R group is

4,040,855

MANUFACTURE OF LIGHTWEIGHT CONCRETE

Arthur A. Rady-Pentek, 3379 Rte. 46, Apt. 14-F, Parsippany, N.J. 07054, and Edwin William Fairweather, 21894 Knudsen Drive, Grosse Ile, Mich. 48138

Filed Aug. 4, 1975, Ser. No. 601,254
Int. Cl.[2] C04B 7/35
U.S. Cl. 106—90 4 Claims

1. The method of making lightweight concrete having a density of 0.340 to 1.060 grams per cubic centimeter which comprises mixing with cement, water, water-reducing admixture and air-entraining agent an aggregate material consisting essentially of a mixture of first and second portions of particles of polystyrene expanded to a density of 0.013 to 0.019 grams per cubic centimeter, said particles being of controlled size such that said first portion thereof consists of beads which in their unexpanded form are substantially all of a diameter between 1.04 and 0.35 millimeters and 90 percent by weight of a diameter between 0.9 and 0.4 millimeters, and said second portion thereof consists of beads which in their unexpanded form are substantially all of a diameter between 1.29 and 0.35 millimeters and 90 percent by weight of a diameter between 1.24 and 0.58 millimeters, said portions being admixed in a

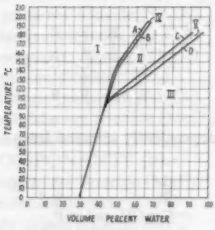
weight ratio of 2.5 to 3.5 parts by weight of said second portion per one part by weight of said first portion, the mixture of particles being of such uniformity that ten samples each of approximately 1200 to 1500 cubic centimeters in volume of loose and dry expanded beads exhibit a co-efficient of variation C_V in respect to absolute-volume factor of under 3.0, said aggregate being mixed with water, cement, water-reducing admixture, air-entraining agent and optionally sand to form said lightweight concrete under conditions such that bead-to-bead contact is substantially wholly avoided.

4,040,856

PRODUCTION OF DISCRETE CELLULOSE ACETATE FIBERS BY EMULSION FLASHING

Paul C. Litzinger, Camas, Wash., assignor to Crown Zellerbach Corporation, San Francisco, Calif.

Filed June 17, 1975, Ser. No. 587,772
Int. Cl.[2] C08L *1/08*
U.S. Cl. 106—170 **6 Claims**



1. A process for producing discrete cellulose alkanoate fibers comprising

a. forming a mixture of a substantially water-insoluble cellulose alkanoate, water and a solvent for the cellulose alkanoate, which solvent has a normal boiling point of less than about 100° C, is present in an amount of from about 1 to 60 volume percent based on the volume of water and solvent, and is miscible with the water in the emulsion at the temperature of the emulsion, the concentration of the cellulose alkanoate being such that the mixture appears as an emulsion of solvent-plasticized liquid droplets of cellulose alkanoate in a continuous water-solvent phase at the temperature of the emulsion, the temperature of the emulsion being between about 120° and 200° C and at least 60° C above the normal boiling point of the solvent, and

b. passing the emulsion through a nozzle into a zone of lower pressure, the pressure in the zone of lower pressure being such that rapid vaporization of the solvent causes the cellulose alkanoate to solidify as discrete fibers.

4,040,857

NON-NEWTONIAN PHARMACEUTICAL COMPOSITIONS

Kenneth J. Lissant, St. Louis, Mo., assignor to Petrolite Corporation, St. Louis, Mo.

Division of Ser. No. 201,562, Nov. 23, 1971, Pat. No. 3,892,881, Continuation-in-part of Ser. No. 784,905, Dec. 18, 1968, abandoned. This application Feb. 21, 1975, Ser. No. 551,727
Int. Cl.[2] A01N *9/04*; B01J *13/00*; C08L *91/00*
U.S. Cl. 106—243 **10 Claims**

1. A pharmaceutical thixotropic high internal phase ratio emulsion characterized by the presence of a pharmaceutical agent therein,

said thixotropic high internal phase ratio emulsion having the characteristics of a solid when at rest and the characteristics of a liquid when a force is exerted on it, the emlsion having (1) an emulsifying agent, (2) a pharmaceutically acceptable emulsifiable oil, and (3) a liquid pharmaceutically acceptable non-oil,

said thixotropic high internal phase ratio emulsion being selected from the group consisting of (1) an oil-in-non-oil emulsion and (2) a non-oil-in-oil emulsion,

the internal phase of said emulsion being present in an amount of at least 80% by volume of the emulsion.

4,040,858

PREPARATION OF PRECIPITATED SILICAS HAVING CONTROLLED REFRACTIVE INDEX

Satish K. Wason, Churchville, Md., assignor to J. M. Huber Corporation, Locust, N.J.

Continuation-in-part of Ser. No. 519,720, Oct. 31, 1974, which is a continuation-in-part of Ser. No. 286,655, Sept. 6, 1972, Pat. No. 3,893,840. This application June 7, 1976, Ser. No. 693,591
The portion of the term of this patent subsequent to Oct. 26, 1993, has been disclaimed.
Int. Cl.[2] C09C *1/28*
U.S. Cl. 106—288 B **11 Claims**

1. A method for the adjustment of the refractive index of a precipitated silica, said precipitated silica being formed by the acidification of a solution of an alkali metal silicate by addition of a mineral acid, wherein the silica precipitates on acidification of the solution, comprising the step of adding an adduct element selected from the group consisting of aluminum, magnesium, zinc and calcium to said solution containing said precipitated silica.

4,040,859

TIN-CONTAINING LUSTROUS PIGMENTS

Reiner Esselborn, and Horst Bernhard, both of Darmstadt, Germany, assignors to Merck Patent Gesellschaft mit beschraenkter Haftung, Darmstadt, Germany

Filed May 18, 1976, Ser. No. 687,458
Claims priority, application Germany, May 22, 1975, 2522573
Int. Cl.[2] C09C *1/00*
U.S. Cl. 106—291 **10 Claims**

1. A lustrous, light-stable mica flake pigment consisting essentially of mica flakes coated by precipitation with up to 90% by weight of the pigment of a continuous, smooth, uniform layer consisting essentially of tin dioxide or a hydrate thereof and up to 10% by weight of coprecipitated aluminum oxide or a hydrate thereof.

4,040,860

CHROMIUM OXIDE PIGMENT FROM SODIUM CHROMATE DIHYDRATE PLUS AMMONIUM SALT

Manfred Mansmann, and Wolfgang Rambold, both of Krefeld, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Feb. 6, 1976, Ser. No. 656,040
Claims priority, application Germany, July 9, 1975, 2530565
Int. Cl.[2] C09C *1/34*
U.S. Cl. 106—302 **12 Claims**

1. In the production of chromium oxide green pigment by heating a substantially stoichiometrically equivalent mixture of sodium dichromate dihydrate and an ammonium salt selected from the group consisting of the sulfate and chloride, the improvement which comprises thoroughly dry mixing sodium dichromate dihydrate having a particle size less than about 2 mm with the ammonium salt having a particle size less than about 0.5 mm, adding water to the mixture in about 1 to 10% by weight of the sodium dichromate dihydrate plus ammonium salt, heating the resulting mixture over a period of about 15 minutes to a pigment-forming temperature of about 800° to 1100° C. calcining the mixture at a temperature in that range, an separating the formed pigment from the salts.

4,040,861

PROCESS OF REFINING ENZYMATICALLY PRODUCED LEVULOSE SYRUPS

Raoul G. P. Walon, Brussels, Belgium, assignor to CPC International Inc., Englewood Cliffs, N.J.

Filed Sept. 9, 1976, Ser. No. 721,741
Claims priority, application Belgium, Mar. 15, 1976, 54881
Int. Cl.[2] C13D *3/12, 3/14;* C13K *11/00*
U.S. Cl. 127—46 A 10 Claims

1. Process for refining an enzymatically produced levulose-bearing syrup comprising subjecting said syrup to treatment with a cation exchanger and an anion exchanger for the removal of ions, and sulfonated coal for the removal of color bodies and color percursors.

4,040,862

PROCESS FOR MAKING A THERMAL CONVERTING STARCH BY MODIFICATION OF OXIDIZED STARCH WITH ALUMINUM SALTS

John E. Voigt, and Edward M. Bovier, both of St. Louis County, Mo., assignors to Anheuser-Busch, Incorporated, St. Louis, Mo.

Filed July 2, 1976, Ser. No. 702,032
Int. Cl.[2] C13L *1/08;* C08B *31/00*
U.S. Cl. 127—70 9 Claims

1. A process for preparing starch for use in paper coating compositions comprising the steps of:

a. forming an aqueous slurry of an unmodified starch,
b. oxidizing said starch to a degree equivalent to that obtained by oxidizing with about 1.0 to about 2.0% available chlorine,
c. adding a water-soluble aluminum salt to said oxidized starch, and
d. adjusting the pH to about 6 to about 7.

4,040,863

METHOD OF TREATING SURFACE OF COPPER AND ITS ALLOYS

Koji Kitamura, Fuji, Japan, assignor to Tokai Denka Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 26, 1976, Ser. No. 735,442
Claims priority, application Japan, Jan. 14, 1976, 51-2737
Int. Cl.[2] B08B *3/08*
U.S. Cl. 134—3 3 Claims

1. In a method of treating surfaces of copper and its alloys to dissolve a layer of metal or oxide scale thereon by contacting said surfaces with an acidic aqueous solution of hydrogen peroxide in the presence of chlorine ions, the improvement which comprises adding to the solution a compound selected from the group consisting of cyclohexanol, methylcyclohexanol, and mixtures thereof, in an amount effective to inhibit reduction of the dissolving activity of the solution by the chlorine ions.

4,040,864

DEVICE AND METHOD FOR CLEANING LEAVES AND DEBRIS FROM SWIMMING POOLS

Claire L. Steeves, 1300 Mistletoe, Fort Worth, Tex. 76110

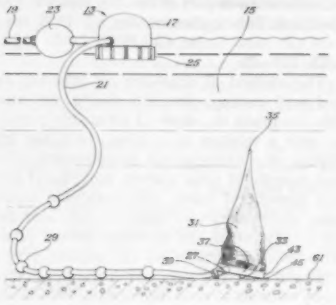
Filed Mar. 12, 1976, Ser. No. 666,507
Int. Cl.[2] B08B *7/00*
U.S. Cl. 134—6 10 Claims

1. A method of cleaning leaves and debris from the bottom of a swimming pool, comprising the steps of:

connecting the mouth of a reticulated bag to the nozzle of an outlet hose of a swimming pool cleaner of the type that has a floating body, an inlet hose connected to a high pressure water supply, a flexible outlet hose for discharging high pressure spray for cleaning, and means for the body to self-propel itself about the swimming pool; the nozzle being oriented so as to direct water spray generally into the bag;

lowering the bag to the swimming pool bottom with the bag oriented so that the hose nozzle is on the upper portion of the mouth;

releasing the hose so that its weight causes the closed end of the bag to tip upwardly, with the mouth facing generally towards the swimming pool bottom and the nozzle on the forward portion of the mouth with respect to the spray,



the rearward portion of the mouth being in contact with the swimming pool bottom; and

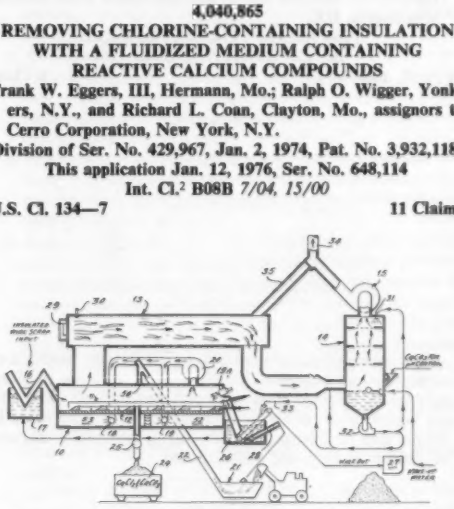
providing water pressure to the swimming pool cleaner so that it will drag the hose and bag about the pool, the rearward edge of the mouth preventing leaves and debris from escaping.

4,040,865

REMOVING CHLORINE-CONTAINING INSULATION WITH A FLUIDIZED MEDIUM CONTAINING REACTIVE CALCIUM COMPOUNDS

Frank W. Eggers, III, Hermann, Mo.; Ralph O. Wigger, Yonkers, N.Y., and Richard L. Coan, Clayton, Mo., assignors to Cerro Corporation, New York, N.Y.

Division of Ser. No. 429,967, Jan. 2, 1974, Pat. No. 3,932,118.
This application Jan. 12, 1976, Ser. No. 648,114
Int. Cl.[2] B08B *7/04, 15/00*
U.S. Cl. 134—7 11 Claims



1. A continuous method for removing insulation containing a chlorine producing substance from items comprising the steps of

A. Feeding the insulation covered items continuously into an enclosed space,
B. Moving the items through said enclosed space,
C. Continuously contacting said items with a particulate reactive fluidized medium which includes a calcium containing compound as said items are moved through said enclosed space,
D. Continuously decomposing the insulation and releasing the reaction chlorine gas therefrom and contacting and reacting the released chlorine gas with the particles of reactive calcium containing fluidized medium, and

E. Continuously removing insulation-free items from the enclosed space.

4,040,866

LAUNDERING OF OIL BASE MUD CUTTINGS

Thomas C. Mondshine, Houston, Tex., assignor to N L Industries, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 404,000, Oct. 5, 1973, abandoned. This application Jan. 15, 1976, Ser. No. 649,553

Int. Cl.[2] B08B *7/00*

U.S. Cl. 134—26 6 Claims

1. The method of removing oil adhering as a coating to drilled well cuttings obtained during the course of drilling which comprises the steps of intimately contacting said cuttings with a mixture of a solvent selected from the group consisting of ethyleneglycol monoisobutyl ether, diethyleneglycol monobutyl ether acetate, ethyl butyl ketone, ethyleneglycol monobutyl ether, ethyleneglycol monomethyl ether acetate, diethyleneglycol diethyl ether, and diethyleneglycol mono-n-hexyl ether and mixtures thereof in any proportion, together with a paraffin oil, the relative proportions of said solvent and said oil being within the range of about 10:90 to 80:20 by volume, so as to form a mixture of oil and said solvent on said cuttings; and thereafter removing said oil-solvent from said cuttings by washing said contacted cuttings with water.

4,040,867

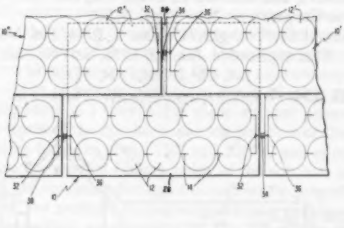
SOLAR CELL SHINGLE

Americo F. Forestieri, Berea; Anthony F. Ratajczak, Medina, and Leroy G. Sidorak, Brookpark, all of Ohio, assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Aug. 24, 1976, Ser. No. 717,319

Int. Cl.[2] H01L *31/04;* E04D *1/00*

U.S. Cl. 136—89 P 6 Claims



1. A solar cell shingle comprising a substrate having a cell portion and an adjacent overlap portion, an array of electrically interconnected solar cells mounted on said cell portion and connected to connectors on said shingle, whereby a like shingle may be arranged in overlapping relation on said overlap portion leaving said cells exposed.

4,040,868

SEMICONDUCTOR DEVICE MANUFACTURE

Mike F. Chang, Liverpool; Harvey E. Cline, and Thomas R. Anthony, both of Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Mar. 9, 1976, Ser. No. 665,276

The portion of the term of this patent subsequent to Feb. 15, 1994, has been disclaimed.

Int. Cl.[2] H01L *21/225*

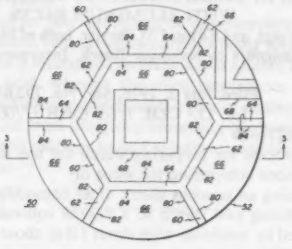
U.S. Cl. 148—1.5 33 Claims

1. An improved method for migrating a melt of metal-rich semiconductor material through a solid body of the semiconductor material including the process steps of:

a. selecting a body of single crystal semiconductor material having two major opposed surfaces comprising the top and bottom surfaces thereof, a predetermined type conductivity, a predetermined level of resistivity, a preferred diamond cubic crystal structure, a preferred planar crystal orientation for at least one of the major surfaces, a vertical axis substantially perpendicular to the opposed major surfaces, and a first preferred crystal axis substantially parallel with the vertical axis and substantially perpendicular to the opposed major surfaces;

b. vapor depositing a layer of metal on the major surface having a preferred planar crystal orientation, the layer having a preferred width and a preferred thickness and so oriented as to form at least one metal wire having a longitudinal axis substantially aligned parallel with a second preferred crystal axis of the crystal structure of the material of the body;

c. heating the body and the layer of metal to an elevated temperature for a predetermined period of time sufficient



to alloy the metal of the layer to at least that portion of the semiconductor material of the major surface of the body in contact therewith;

d. heating the body and the alloyed metal wire to a predetermined elevated temperature sufficient to form a melt of metal-rich semiconductor material on the surface of the body;

e. establishing a temperature gradient substantially parallel to the vertical axis of the body and the first axis of the crystal structure; and

f. migrating the melt of metal-rich semiconductor material through the solid body, substantially aligned with the first axis of the crystal structure, to a predetermined depth beneath that major surface to form a planar region of recrystallized material of the body having solid solubility of the metal of the layer therein.

4,040,869

HIGH VOLTAGE DEEP DIODE POWER SEMICONDUCTOR SWITCH

Thomas R. Anthony, and Harvey E. Cline, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 556,709, March 10, 1975, Pat. No. 3,988,767, which is a continuation of Ser. No. 411,019, Oct. 30, 1973, abandoned. This application Apr. 19, 1976, Ser. No. 678,293

Int. Cl.[2] H01L *7/00, 29/00, 29/74, 23/32*

U.S. Cl. 148—1.5 18 Claims

1. A method for making a high voltage deep diode power semiconductor switch comprising the process steps of

a. selecting a body of single crystal semiconductor material having two major opposed surfaces comprising, respectively, the top and bottom surfaces thereof, a first predetermined level of resistivity, a first predetermined type conductivity, and a preferred planar crystal structure orientation for at least one of the major opposed surfaces, the planar crystal structure orientation is one selected from the group consisting of (111), (100) and (110);

b. orienting the body so that the vertical axis of the body is substantially aligned with a first crystal axis of the crystal

structure of the material and which is substantially perpendicular to the at least one major opposed surface having the preferred planar crystal structure orientation;

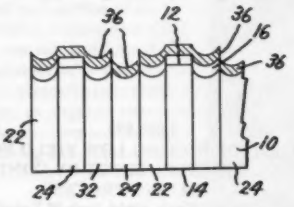
c. disposing a first array of metal wires having a selected configuration on a major surface of the body, the metal comprising at least one material suitable for imparting to a portion of the material of the body a second predetermined type conductivity and a second predetermined level of resistivity, each metal wire having a preferred stable wire direction which is dependent upon the planar orientation of the major surface and is oriented substantially parallel with a second preferred axis of the material of the body;

d. heating the body and the first array of metal wires to a temperature sufficient to form an array of liquid wires of metal-rich semiconductor material on the major surface of the body;

e. establishing a first thermal gradient in the body substantially parallel with the vertical axis of the body and the first crystal axis of the material of the body, the major surface having the array of liquid wires being at the lower temperature;

f. migrating the array of liquid wires entirely through the body from the major surface of lower temperature to the major surface of higher temperature substantially parallel with the first crystal axis;

g. forming in situ in the body a plurality of first spaced planar regions, each having two opposed major surfaces and consisting of recrystallized semiconductor material of the body having solid solubility of the metal of the liquid



wire therein, as determined by the temperature of migration, the semiconductor material and the metal of the migrated wire, each first region being formed by the migration of one particular liquid wire, the level of concentration of the at least one material being sufficient to impart the second and opposite type conductivity and the second predetermined level of resistivity to each first spaced planar region;

h. forming first and second P-N junctions at the respective abutting major surfaces of the material of each first spaced region and that of the body, each P-N junction being substantially perpendicular to the opposed major surfaces of the body and thereby forming a lamellar structure of a plurality of integral planar regions of alternate and opposite type conductivity;

i. disposing a second array of metal wires having a selected configuration on a major surface of the body wherein each wire is disposed between a pair of the first planar regions, the metal comprising at least one material suitable for imparting to a portion of the material of the body a second predetermined type conductivity and a third predetermined level of resistivity, each metal wire having a preferred stable wire direction which is oriented substantially parallel to the second preferred axis of the material of the body;

j. establishing a second thermal gradient in the body substantially parallel with the vertical axis of the body and the first crystal axis of the material of the body, the major surface having the array of liquid wires being at the lower temperature;

k. migrating the array of liquid wires entirely through the body from the major surface of lower temperature to the major surface of higher temperature substantially parallel with the first crystal axis;

l. forming in situ in the body a plurality of second spaced planar regions, each having two major opposed surfaces and consisting of recrystallized semiconductor material of the body having solid solubility of the metal of the liquid wire therein as determined by the temperature of migration, the semiconductor material of the body and the metal of the migrated wire, each second region being formed by the migration of one particular liquid wire, the level of concentration of the at least one material being sufficient to impart the second and opposite type conductivity and the third predetermined level of resistivity to each second spaced planar region;

m. forming third and fourth P-N junctions at the respective abutting major surfaces of the material of each second spaced region and that of the body, each third and fourth P-N junctions being substantially perpendicular to the opposed major surfaces of the body and thereby forming one or more groups of a lamellar structure of four integral planar regions of first and second planar regions and two regions of material of the body;

n. disposing a third array of metal wires having a selected configuration on a major surface of the body wherein each wire is disposed between, and overlaps a portion of each of, a pair of first and second spaced planar regions and the respective first and fourth P-N junctions therebetween, the metal comprising at least one material suitable for imparting to a portion of the material of the body a first type conductivity and a fourth predetermined level of resistivity, each metal wire having a preferred stable wire direction which is oriented substantially parallel to the second preferred axis of the material of the body;

o. establishing a third thermal gradient in the body substantially parallel with the vertical axis of the body and the first crystal axis of the material of the body, the major surface having the array of liquid wires being at the lower temperature;

p. migrating the array of liquid wires entirely through the body from the major surface of lower temperature to the major surface of higher temperature substantially parallel with the first crystal axis;

q. forming in situ in the body a plurality of third spaced planar regions, each having two major opposed surfaces and consisting of recrystallized semiconductor material of the body having solid solubility of the metal of the liquid wire therein as determined by the temperature of migration, the semiconductor material of the body and the metal of the migrated wire, each third region being formed by the migration of one particular liquid wire, the level of concentration of the at least one material being sufficient to impart the first type conductivity and the third predetermined level of resistivity to each third spaced planar region;

r. reforming the first and the fourth P-N junctions at the respective abutting major surfaces of the material of each third planar region and that material of the first planar region and that material of the second planar region;

s. dividing the processed body into at least one group of four integral planar regions of alternate and opposite conductivity forming a lamellar structure having in order the first planar region, a fourth planar region which consists of material of the body, the second planar region and the third planar region, and

t. affixing an ohmic electrical contact to the first planar region and affixing an ohmic electric contact to the third planar region whereby the lamellar structure will function as a semiconductor switch when a voltage is impressed across the two ohmic electrical contacts.

4,040,870

DEPOSITION METHOD

Robert A. Holzl, La Canada, Calif., assignor to Chemetal Corporation, Pacoima, Calif.

Continuation-in-part of Ser. No. 358,110, May 7, 1973, abandoned. This application June 19, 1975, Ser. No. 588,390
Int. Cl.[2] C23C *11/00*
U.S. Cl. 148—6.3 16 Claims

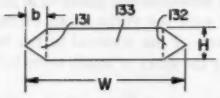
1. A method for producing a hard deposit on a substrate, comprising, providing a gaseous volatile halide of titanium, reducing said volatile halide off the surface of the substrate to form a lower halide of titanium, reacting said lower halide in the presence of a volatile halide of boron, carbon or silicon downstream from said halide reduction while maintaining the pressure and substrate temperature such as to cause the deposition on the substrate of an intermediate compound of titanium which is in a liquid phase, and reacting the liquid phase intermediate compound on the surface of the substrate with a volatile halide of boron, carbon or silicon to produce a hard deposit containing titanium and boron, carbon or silicon.

4,040,871

METHOD FOR PRODUCING AN INDIVIDUAL FIN-FREE SPOT SCARFING CUT

Stephen August Engel, Shenorock, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Filed Aug. 26, 1975, Ser. No. 607,888
Int. Cl.[2] B23K *7/06*
U.S. Cl. 148—9.5 4 Claims



1. In a process for machine searfing individual defects from the surface of a metal body, wherein a sheet-like stream of oxygen is directed obliquely against a reaction zone of molten metal to produce a thermochemical reaction thereon, and wherein relative movement is produced between the oxygen stream and the metal surface in order to continue the reaction along the length of the metal surface and to produce the desired individual scarfing cut, the improvement comprising: preventing the formation of fins along the edges of the scarfing cut by restricting the flow of said oxygen at the edges of said stream so as to gradually diminish the intensity of the oxygen stream at the edges thereof to such an extent that the flow of oxygen at the edges of the stream is insufficient to produce a scarfing reaction on the metal surface but sufficient to oxidize any molten metal at the edges of the scarfing reaction zone thereby preventing said molten metal from solidifying and adhering to the surface of said metal body along the edges of the scarfing cut in an unoxidized state and producing a fin-free scarfing cut narrower than the width of the oxygen stream, and wherein the flow of oxygen at the edges of said stream is restricted by directing said stream of scarfing oxygen through a nozzle terminating in a discharge orifice characterized by having:

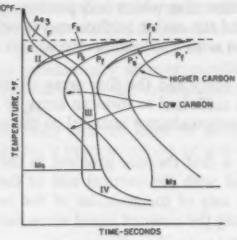
a. a width greater than its maximum height, and said height gradually decreasing to zero at the edges thereof,
b. a center section and two end sections, the ratio of the width of the end sections of the orifice to the height of said end sections being from about 2:1 to 10:1, and
c. the center section of said orifice comprising parallel upper and lower edge surfaces.

4,040,872

PROCESS FOR STRENGTHENING OF CARBON STEELS

Edeki Mudiare, Chicago, Ill., assignor to LaSalle Steel Company, Chicago, Ill.

Filed Apr. 16, 1976, Ser. No. 677,742
Int. Cl.[2] C21D *9/52*
U.S. Cl. 148—12 B 31 Claims



1. A method for the strengthening of a carbon steel comprising the steps of (1) rapidly heating the carbon steel to raise the temperature of the steel into the austenite region at a rate sufficient to minimize grain growth of austenite grains, (2) cooling the austenitized carbon steel to transform the steel to a fine mixture of acicular pro-eutectoid ferrite and a finely divided eutectoid aggregate of ferrite and iron carbide, and (3) working the resulting steel to strengthen the steel.

4,040,873

METHOD OF MAKING LOW YIELD POINT COLD-REDUCED STEEL SHEET BY CONTINUOUS ANNEALING PROCESS

Kazuhide Nakaoka, and Kenji Araki, both of Yokohama, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 6, 1975, Ser. No. 629,525
Claims priority, application Japan, Aug. 23, 1975, 50-102283
Int. Cl.[2] C21D *9/48*
U.S. Cl. 148—12 C 4 Claims

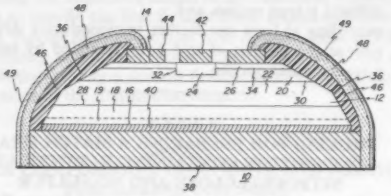
1. In a process of making a low carbon steel sheet for press-forming through a continuous annealing, an improved method substantially comprising the following treatment:

a. In steelmaking stage, the chemical composition of said low carbon steel is controlled as follows,
C, 0.03% to 0.10%
Mn, 0.10% to 0.60%
P, 0.04% or less
S, 0.05% or less
Si, 0.2% or less
Sol.Al, 0.005% or less
O_2, 0.02% or less, by addition of Si and Al.
b. In hot-rolling stage after ordinary slabbing, a hot-roller steel strip is finished at 800° C or more and is coiled at a temperature of 650° C to 800° C.
c. In continuous annealing stage after ordinary pickling and cold reducing, a cold-reduced steel strip is subjected to the full continuous annealing process comprising the following steps,
1. heating up within the range of 680° C to 900° C and holding for 30 to 180 seconds,
2. cooling to 500° C or less with a rate of 10° C/second or more,
3. over-aging treating within the range of 350° C to 500° C for 30 to 600 seconds,
4. cooling to room temperature and then coiling.

4,040,874
SEMICONDUCTOR ELEMENT HAVING A POLYMERIC PROTECTIVE COATING AND GLASS COATING OVERLAY

Alexander J. Yerman, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 601,839, Aug. 4, 1975, Pat. No. 4,017,340. This application Jan. 10, 1977, Ser. No. 757,887
Int. Cl.[2] H01L *29/28*
U.S. Cl. 148—33.3 26 Claims



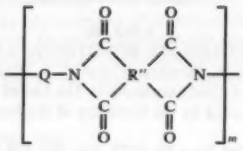
1. A semiconductor element comprising:

a body of semiconductor material having at least two regions of opposite type conductivity and a P-N junction disposed between, and formed by the abutting surfaces of, each pair of regions of opposite type conductivity;

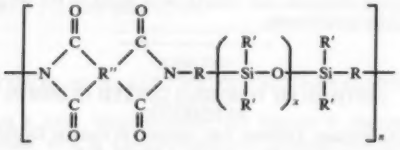
an end portion of at least one P-N junction exposed at a surface of the body;

a layer of a protective coating material disposed on the exposed end portion of the at least one P-N junction;

the protective coating material is a polymer which is, when cured, one selected from the group consisting of the reaction product of a silicon-free organic diamine and an organic tetracarboxylic dianhydride, a silicon-free organic diamine, an organic tetracarboxylic dianhydride and a polysiloxane diamine and a blend of polyimide compound of recurring structural units of the formula:



with a polyimide, as required, composed of recurring structural units of the formula:



wherein the molar proportion of the latter is from 0 to 50 mol percent

wherein

R is a divalent hydrocarbon radical,

R′ is a monovalent hydrocarbon radical,

R″ is a tetravalent organic radical,

Q is a divalent silicon-free organic radical

which is the residue of an organic diamine,

x is a whole number equal to at least 1 and advantageously from 1 to 8 and as high as 1 to 10,000 or more,

m is an integer greater than 1

n is zero or an integer greater than 0, and

at least one layer of a glass material disposed on the layer of protective coating material.

4,040,875
DUCTILE CAST IRON ARTICLES

Charles H. Noble, 3541 Brookwood Road, Birmingham, Ala. 35223

Division of Ser. No. 564,608, April 3, 1975, Pat. No. 3,977,227, which is a continuation-in-part of Ser. No. 445,655, Feb. 5, 1974, abandoned. This application May 3, 1976, Ser. No. 682,251
Int. Cl.[2] C22C *37/10*
U.S. Cl. 148—35 6 Claims

1. An article of manufacture comprising an annular ductile iron piece containing

1–4.25% carbon,

1–4.25% silicon,

0–.20% phosphorous, and

at least one nodularizing agent,

at least an axial portion of said ductile iron piece being characterized by

having the carbon content thereof in the form of significantly flattened bodies which are predominantly disposed in planes parallel to the central axis of the piece and normal to the outer surface of the piece along the line of intersection between the plane and the outer surface, and

by having the iron grains thereof significantly extended both in a direction parallel to the central axis of the piece and in directions which are transverse to said axis and parallel to said planes;

said piece having a smooth uninterrupted outer surface and being from from structural failure discontinuities,

at least said axial portion having been cold extruded through a tapered female die by applying axial pressure to the piece until the compressive yield point of the ductile iron is reached and the metal is caused to traverse the die in plastic flow while maintained under hoop compression.

4,040,876
HIGH TEMPERATURE ALLOYS AND MEMBERS THEREOF

Melvin L. Bleiberg, Pittsburgh; Sidney Diamond, Monroeville; Arthur F. Rowcliffe, Greensburg, and John A. Spitznagel, Export, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed July 2, 1974, Ser. No. 485,465
Int. Cl.[2] C22C *38/44;* C21D *7/02*
U.S. Cl. 148—37 2 Claims

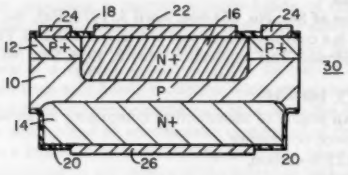
1. A shaped alloy member suitable for use in a nuclear reactor incorporating sodium wherein the member is in contact with the molten sodium at temperatures up to about 1325° F and subject to high neutron flux, the alloy comprising said member consisting essentially of from about 14% to 19% chromium, from about 25% to 35% nickel, from about 2% to 3% molybdenum, from about 0.1% to 1% silicon, up to about 0.5% manganese, from about 0.03% to 0.05% carbon, up to about 0.01% sulphur, up to about 0.01% phosphorus, up to about 0.003% boron, up to about 0.01% oxygen, up to about 0.02% nitrogen, the balance being essentially iron with trace impurities with the N_v value thereof being between 1.6 and 2.8, said alloy characterized by a low corrosion rate not in excess of from about 1 to 2 mils per year for the surfaces in contact with the sodium and further characterized by a low swelling not exceeding about 5% after exposure to 3×10^{23} nvt, said shaped alloy member having been worked equivalent to from about 20% to 30% of cold working and heat treated to solution harden it and to develop high creep rupture strength and high yield strength at the temperatures of use in the nuclear reactor.

4,040,877

METHOD OF MAKING A TRANSISTOR DEVICE

Joseph E. Johnson, Churchill, and John A. Ostop, Greensburg, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 24, 1976, Ser. No. 717,076
Int. Cl.[2] H01L *21/22*
U.S. Cl. 148—187 **6 Claims**



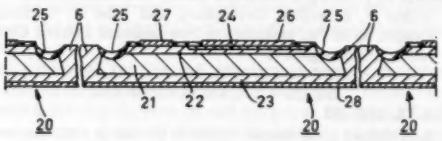
1. A method of making a transistor device comprising the steps:
   a. diffusing shallow regions of a first conductivity type into both sides of a semiconductor wafer of a second conductivity type,
   b. etching moats in one surface of the wafer, the moats penetrating through the shallow first conductivity type regions into the second conductivity type region to form isolated transistor portions surrounded by the moats,
   c. depositing a passivation layer on the surfaces of the semiconductor wafer,
   d. driving the first conductivity type regions to a predetermined depth in the wafer,
   e. opening windows through the passivation layer to expose surface portions for contacting the wafer, and
   f. applying metal contacts to the wafer through the windows.

4,040,878

SEMICONDUCTOR DEVICE MANUFACTURE

Colin M. Rowe, Manchester, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 22, 1976, Ser. No. 668,946
Claims priority, application United Kingdom, Mar. 26, 1975, 12649/75
Int. Cl.[2] H01L *21/225*
U.S. Cl. 148—188 **12 Claims**



1. A method of manufacturing a semiconductor device comprising a silicon semiconductor body with a portion forming at least one semiconductor device region, said portion being bounded by a deep p-type annular portion, said method comprising the steps of:
   a. providing an aluminum diffusion source on part of at least a first major surface of said silicon semiconductor body by depositing aluminum to form a metallic layer having a thickness in the range of 0.2 micron to 5 microns and locally removing parts of said metallic layer to leave a metallic aluminum pattern comprising at least one annular portion,
   b. subjecting said body in an oxidizing atmosphere to one or more heating states during which the body is heated under temperature and time conditions so as to diffuse aluminum from said aluminum pattern into said body to form in said body a deep p type region with a total depth of at least 75 microns, which region extends locally in said body from said first major surface and comprises at least one deep p type annular portion, said oxidizing atmosphere serving to inhibit diffusion of aluminum in said body except in the form of said deep p type region,
   c. growing a silicon oxide layer by said oxidizing atmophere at portions of said first major surface not covered by said aluminum pattern, said silicon oxide layer serving to extract aluminum from underlying parts of said body and to transport said extracted aluminum into the oxidizing atmosphere,
   d. removing from said body the residue of said diffusion source and said silicon oxide layer to leave said deep diffused p type region, and
   e. providing at least one further semiconductor device region at the portion of said body bounded by said deep p-type annular portion.

4,040,879

PROCESS FOR PREPARING A MATCH HEAD COMPOSITION CONTAINING PARTICULATE NITROCELLULOSE AND NO SULFUR

Shuzo Nagatugi, Kobe; Akira Miyagawa, and Suguru Fukuoka, both of Himeji, all of Japan, assignors to Daicel Ltd., Osaka, Japan

Filed Feb. 2, 1976, Ser. No. 654,346
Int. Cl.[2] C06B *45/08*
U.S. Cl. 149—18 **4 Claims**

1. In a method for preparing a match head composition which comprises blending a mixture consisting essentially of potassium chlorate as an igniting agent, a combustion controlling agent selected from the group consisting of glass powder, mica powder, talc, diatomaceous earth, colloidal clay, boric acid and mixtures thereof, and a binder selected from the group consisting of glue and gelatin, the improvement which comprises: blending in said match head composition as a combustion agent, an effective amount, but not more than 10 weight percent (dry basis), of cellulose nitrate particles having a particle size of less than 840 microns and containing more than 20 weight percent of water, said match head composition being free of sulfur and being free of organic solvent.

4,040,880

PERCHLORATE SENSITIZING AGENT

Julius Rothenstein, Carmichael, and G. A. Zimmerman, Sacramento, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 28, 1973, Ser. No. 375,244
Int. Cl.[2] C06B *31/28*
U.S. Cl. 149—76 **10 Claims**

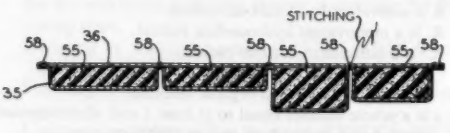
1. The method of sensitizing inorganic perchlorate salts comprising mixing said salts with about 1–8 percent by weight of copper chromite, said weight being based on the weight of inorganic perchlorate.

4,040,881

METHOD OF FORMING TUFTED CUSHION ELEMENTS

Earl C. Wallace, Andrews, Ind., assignor to General Engineering & Manufacturing Corporation, Andrews, Ind.

Filed Mar. 22, 1976, Ser. No. 669,307
Int. Cl.[2] B32B *7/08*
U.S. Cl. 156—93 **12 Claims**



1. A method of forming flexible, tufted cushion elements having an array of a plurality of contiguous sections of differ-

ent thicknesses, geometric forms and sizes enclosed in a continuously flexible sheet material comprising:

placing a first sheet of flexible material on a female pattern form having an array of cavities of different depths, geometric forms and sizes corresponding to said cushioned elements separated by partitions;

tucking the first flexible sheet of material into the partitioned cavities of said female pattern form to conform to the walls of the form cavities;

pre-forming bodies of resilient cushioning material of the general geometric form of said sections;

mounting the respective bodies in the respective form cavities to overlie the first flexible sheet within said cavities and expose portions of the first flexible sheet portions extending across the exposed edges of the partitions; and

adhesively bonding a second flexible sheet on the exposed portions of the first flexible sheet.

4,040,882

PRIMER COMPOSITION, COMPOSITE AND METHOD FOR MAKING THE SAME

Donald G. LeGrand, Burnt Hills, and Gina G. Vitale, Saratoga Springs, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Sept. 29, 1975, Ser. No. 618,474

Int. Cl.[2] C03C *27/04;* C32B *17/10;* C07F *7/02*

U.S. Cl. 156—106 **10 Claims**

1. A primer composition in the form of the equilibrated reaction product of

A. water

B. a $C_{(1-8)}$ alkanol, and

C. the reaction mixture at temperatures in the range of between 0° C to 90° C of 1 to 3 moles of an amino alkyl polyalkoxysilane per mole of a diorganocarbonate,

where there is employed in such equilibrated reaction product on a volume basis, from 0.5 to 10 parts of (A), and from 0.5 to 10 parts of (C) per 100 parts of (B).

5. A method for making a multi-ply composite which comprises heating to an elevated temperature an assembly of at least two plies comprising a glass substrate and a polydiorganosiloxane-polycarbonate block copolymer, while subjecting such assembly to a pressure of at least about atmospheric which is sufficient to insure substantially uniform contact between the plies, where the glass substrate has been primed with a composition in the form of the equilibrated reaction product of

A. water

B. a $C_{(1-8)}$ alkanol, and

C. the reaction mixture at temperatures in the range of between 0° C to 90° C of 1 to 3 moles of an amino alkyl polyalkoxysilane per mole of a diorganocarbonate,

where there is employed in such equilibrated reaction product on a volume basis, from 0.5 to 10 parts of (A), from 0.5 to 10 parts of (C) per 100 parts of (B).

4,040,883

METHOD OF MAKING A LOW-FRICTION FABRIC BEARING

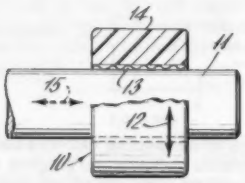
Richard J. Matt, West Simsbury, and Richard T. Thompson, Haddam, both of Conn., assignors to Textron, Inc., Providence, R.I.

Continuation-in-part of Ser. No. 511,086, Oct. 1, 1974, abandoned. This application June 28, 1976, Ser. No. 700,151

Int. Cl.[2] B32B *5/08*

U.S. Cl. 156—148 **22 Claims**

1. The method of making an annular bearing having a low-friction fabric lined surface of predetermined contour to accommodate a load under sliding conditions wherein the fabric surface slides generally along a particular directional path of movement, which method comprises selecting a loosely twisted yarn consisting of TFE filaments and bondable filaments, constructing a knitted tube with said yarn as the most predominant component, said tube being so constructed that on one side of said tube exposed filaments are primarily oriented in the direction of the tube axis and on the other side of said tube exposed filaments are primarily oriented normal to and circumferential to the tube axis, impregnating the fabric with an uncured synthetic resin, conforming the circumferential extent of a selected side of the knitted tube to a selected forming element having a forming-surface contour conforming



to said predetermined contour, the selected side forming the bearing interface and being chosen as that for which there is the greater non-conformance of primary orientation of the exposed filaments with respect to said particular directional path of movement, curing the resin while the tube is thus confined, and mounting the bearing such that sliding action under load is along said particular directional path of movement.

4,040,884

MEDICAL SPONGES

Roy William Roth, New Canaan, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 480,643, June 19, 1974, Pat. No. 3,977,406. This application Dec. 22, 1975, Ser. No. 643,467

Int. Cl.[2] B31F *1/00*

U.S. Cl. 156—209 **7 Claims**

1. A method for the production of a flexible, hydrophilic polyurethane sponge adapted for medical usage which comprises (1) embossing, with a fused design, a flat, hydrophilic polyurethane foam sheet of about 1/16 to about ¼ inch in thickness to about 25 to about 95% of its original thickness in the area of said design, the remaining area being of the original thickness, at a temperature ranging from about 250° to about 350° F and a pressure of from about 1000 psi to about 2000 psi, said design being composed of a series of continuous, unbroken lines no more than about one inch apart, each end of each line terminating at an edge of said sheet and intersecting another line at least about every inch in each direction, (2) texturizing the complete surface of said sheet at a temperature of from about 50° to about 300° F at a pressure of from about 2000 psi to about 3000 psi so as to break substantially all of the reticulated cells at said surface of said sheet and (3) recovering the resultant sponge.

4,040,885

ULTRASONIC BONDING APPARATUS

Michael John Hight, Redhill; Roy Victor Winkle, Crawley, and John Robert Dale, Brighton, all of England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed July 9, 1975, Ser. No. 594,271

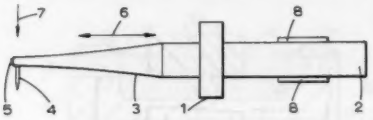
Claims priority, application United Kingdom, July 9, 1974, 30383/74

Int. Cl.[2] B23K *1/06*

U.S. Cl. 156—378 **22 Claims**

2. An ultrasonic wire bonding apparatus comprising, a bonding tool for securing a wire to a body, primary transducer means coupled to the bonding tool for converting electrical input signals into mechanical vibrations of the bonding tool at ultrasonic frequency, secondary transducer means for producing electrical signals indicative of the amplitude of the vibrations of the bonding tool, signal sampling means for sampling

signals derived from the secondary transducer means at a certain power input to the primary transducer means and with the bonding tool in a freely vibrating condition and for sampling signals derived from the secondary transducer means with the same power input to the primary transducer means and with a wire bonding operation in progress, signal comparison means for comparing the signals sampled in the freely



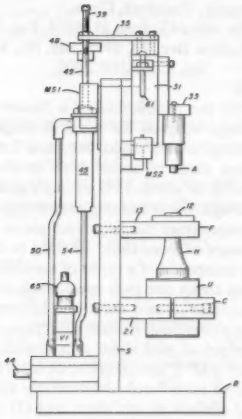
vibrating condition of the bonding tool with the signals sampled when said bonding operation is in progress, and indicator means associated with the signal comparison means for indicating a bond of unacceptable quality corresponding to a predetermined minimum amplitude deviation between the freely vibrating condition and the vibration during a bonding operation.

4,040,886

APPARATUS FOR TREATING A WORKPIECE

Edward Chen-Hsiung Yen, and Thomas Arthur Jenssen, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 30, 1976, Ser. No. 681,948
Int. Cl.[2] B29C *27/08;* B23K *1/06;* B30B *1/00*
U.S. Cl. 156—350 **8 Claims**



1. Apparatus for applying ultrasonic vibrations to a workpiece, said apparatus comprising:

an ultrasonic transducer including a horn engageable with the workpiece for transmitting ultrasonic vibrations to the workpiece;

an anvil vertically aligned with said horn for supporting the workpiece against the vibrations transmitted by said horn;

a fixture including means for releasably holding the workpiece between said anvil and said horn;

vertically moveable means including one of said transducer and said anvil for engaging the workpiece between said transducer and said anvil to apply pressure on the workpiece;

mean for releasably holding said vertically moveable means spaced above said fixture in a ready position;

means for releasing said vertically moveable means from the ready position to fall solely by the force of gravity toward said fixture; and

dampening means coacting with said vertically moveable means for retarding the fall of said vertically moveable means to an acceleration less than gravity;

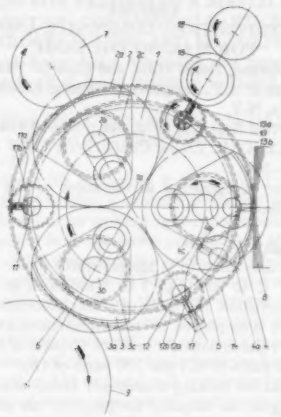
whereby the pressure exerted on the workpiece between said transducer and said anvil is due solely to the weight of said vertically moveable means, but the impact of said vertically moveable means upon engagement with the workpiece is less than would be due to the free falling weight of said vertically moveable means.

4,040,887

LABELLING MACHINE

Rudolf Zodrow, Dusseldorf, Germany, assignor to Jagenberg-Werke Aktiengesellschaft, Dusseldorf, Germany

Filed Apr. 8, 1976, Ser. No. 675,015
Claims priority, application Germany, Apr. 19, 1975, 2517442
Int. Cl.[2] B41M *1/00*
U.S. Cl. 156—384 **6 Claims**



1. In a labelling machine for objects, such as bottles, and having glue applying means, a stack of labels, and a label transfer station arranged about a circle, at least one pick-up element for the labels, a support for said pick-up element, means for rotating said support and thereby said pick-up element so the pick-up element successively receives glue, picks up a label and transfers it to another member for subsequent application to a bottle, and means for printing said labels prior to application to said bottles, the improvement wherein said printing means comprises an inking element positioned between the glue applying means and the stack of labels and touching the circle tangentially, and an ink receiving stamping element carried by said support behind each pick-up element, whereby upon rotation of said support said stamping element is inked and after a pick-up element removes a label from the stack the inked stamping element prints the next now-uppermost label in the stack.

4,040,888

APPARATUS FOR PREPRESSING TRANSPARENT LAMINATED ASSEMBLIES

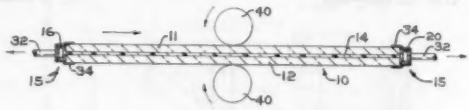
Frank A. Soska, Arnold, and Lyle L. Shumaker, Natrona Heights, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 487,334, July 10, 1974, abandoned.
This application Oct. 1, 1975, Ser. No. 618,587
Int. Cl.[2] B32B *31/00;* B30B *3/04*
U.S. Cl. 156—497 **6 Claims**

1. Apparatus for prepressing an assembly of rectangular configuration to be laminated without requiring the insertion of said assembly within a bag, said assembly comprising a series of alternate layers of rigid transparent material and of inter-

layer material having a given total thickness between the outer major surfaces of said assembly, said layers being assembled in matching rectangular outline, said apparatus comprising

1. an evacuation chamber abutting against and extending around the periphery of said assembly and having a pair of opposite walls whose outer surfaces form the outer surfaces of said chamber and are spaced from one another less than said total thickness, said outer surfaces being disposed inward of the major surfaces of said assembly, said evacuation chamber having an apertured inner wall whose apertures are adapted to abut the marginal edge of said assembly in position to enable said evacuation chamber to communicate with the interfacial surfaces intermediate said alternate layers on all four peripheral edges of said assembly,
2. means adapted to communicate said evacuation chamber to a source of vacuum,
3. thin, flexible means impervious to gas and moisture superimposed over said outer surfaces of said evacuation chamber and the marginal portion only of said outer major surfaces of said assembly to connect said outer surfaces of said evacuation chamber to the outer major surfaces of said assembly and to hold said evacuation chamber in said relation to said assembly, said flexible means having a maximum thickness such that the total thickness of two layers thereof plus that of the peripheral evacuation chamber as measured between said outer surfaces of said evacuation chamber is less than the thickness of said assembly,
4. a pair of resilient nipper rolls mounted for rotation, and
5. means to maintain said nipper rolls at a space therebetween such that the minimum distance between the opposing peripheries of the rolls is approximately equal to the thickness of the assembly, so that when said rolls rotate across said assembly, they engage the opposite major surfaces of the assembly and pass over the evacuation chamber in non-contacting relation to the portion of said flexible means superimposed over said outer surfaces of said evacuation chamber.



4,040,889

APPARATUS FOR MANUFACTURING AN ELECTROWELDING COMPONENT OF SYNTHETIC MATERIAL COMPRISING A RESISTANCE ELEMENT

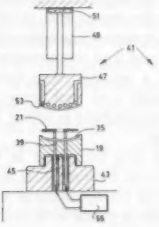
Petrus Marinus Acda, Enkhuizen, Netherlands, assignor to Polva Nederland,BV, Enkhuizen, Netherlands

Filed Feb. 17, 1976, Ser. No. 658,221

Claims priority, application Netherlands, Feb. 21, 1975, 7502051

Int. Cl.[2] B32B *31/00*

U.S. Cl. 156—498 **1 Claim**



1. An apparatus for manufacturing an electrowelding component, comprising a jig having a surface shaped for locating and supporting said component, said jig comprising two sleeves of insulating material extending parallel to each other through said jig from said shaped surface and arranged for receiving electrical connection pins for a component to be assembled; a die having a pressure surface shaped so as to form a surface of the component, said die comprising a material having a high coefficient of heat conductivity, and having duct means for passing cooling medium therethrough; means for locating and moving said die with respect to said jig, and pressing said jig and said die toward each other; and electric energy means for passing electrical current through pins of a component placed in said sleeves.

4,040,890

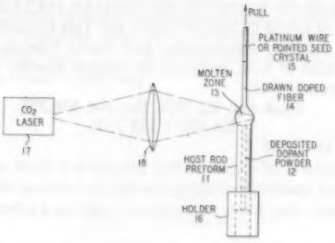
NEODYMIUM OXIDE DOPED YTTRIUM ALUMINUM GARNET OPTICAL FIBER

Charles Andrew Burrus, Jr., Fair Haven, and Julian Stone, Rumson, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 27, 1975, Ser. No. 591,178

Int. Cl.[2] B01J *17/18, 17/36*

U.S. Cl. 156—605 **1 Claim**



1. A method for drawing a craze-free single-crystal fiber of YAG (yttrium aluminum garnet) of diameter less than about 200 micrometers, doped with neodymium to a uniform concentration of about 1 percent by weight comprising the steps of:

mechanically distributing a deposit of dopant consisting of a powder or slurry of neodymium oxide over an entire axial length of a rod of YAG, the concentration of applied dopant being within the range from about 1 percent to about 5 percent by weight,

creating a melt at one end of the rod by focusing a laser beam thereon,

pulling a reduced diameter single-crystal rod from said melt, the ratio of the diameter of the feed rod to that of the drawn rod being less than about 3:1,

repeating the above steps of melting and pulling until the rod is reduced to a fiber having a diameter of about 200 micrometers,

repeating the above melting and pulling steps at a pull speed of less than about one half centimeter per minute, until the desired diameter of fiber is reached.

4,040,891

ETCHING PROCESS UTILIZING THE SAME POSITIVE PHOTORESIST LAYER FOR TWO ETCHING STEPS

Kenneth Chang, Hopewell Junction, and Marvin S. Pittler, Poughkeepsie, both of N.Y., assignors to IBM Corporation, Armonk, N.Y.

Filed June 30, 1976, Ser. No. 701,068

Int. Cl.[2] H01L *21/306;* C23F *1/02*

U.S. Cl. 156—651 **11 Claims**

1. In integrated circuit fabrication, a method for etching a substrate comprising

forming a positive photoresist layer on a substrate,

selectively exposing and developing portions of the photore-

sist layer to form a photoresist mask having a pattern of openings therethrough exposing the underlying substrate,

etching the substrate exposed in said openings to form a corresponding pattern of recesses in said substrate,

selectively exposing and developing portions of the remaining photoresist layer respectively adjacent to said openings to laterally expand said openings, and

etching said substrate exposed in said expanded openings whereby the portions of recesses underlying the original openings are etched deeper than the portions of the recesses underlying the expanded portions of said openings.

4,040,892

METHOD OF ETCHING MATERIALS INCLUDING A MAJOR CONSTITUENT OF TIN OXIDE

Paul L. Sargent, Schenectady, and Mario Ghezzo, Ballston Lake, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Apr. 12, 1976, Ser. No. 676,370
Int. Cl.[2] C23F *1/02*
U.S. Cl. 156—659 **7 Claims**

1. A method of etching a first pattern in a layer of a binary compound material including a major constituent of tin oxide and a minor constituent of antimony oxide on a substrate comprising

depositing a film of material which is resistant to the etching action of hot concentrated hydroiodic acid over the exposed surface of said layer,

forming in said film a second pattern which is substantially identical to said first pattern to expose portions of said layer of material uncovered thereby,

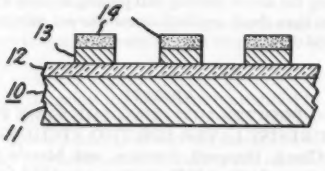
etching said uncovered portions of said layer of material in a concentrated solution of hot hydroiodic acid.

4,040,893

METHOD OF SELECTIVE ETCHING OF MATERIALS UTILIZING MASKS OF BINARY SILICATE GLASSES

Mario Ghezzo, Ballston Lake, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Apr. 12, 1976, Ser. No. 676,367
Int. Cl.[2] H01L *21/312*; B44C *1/22*; C23E *1/00*
U.S. Cl. 156—659 **13 Claims**



1. A method of etching a first pattern in a layer of material formed on the surface of a substrate including a region of silicon dioxide comprising

depositing a film of a binary silicate glass on the exposed surface of said layer,

forming in said film a second pattern which is substantially identical to said first pattern to expose portions of said layer of material uncovered thereby,

etching said uncovered portions of said layer with a first etchant which does not etch silicon dioxide,

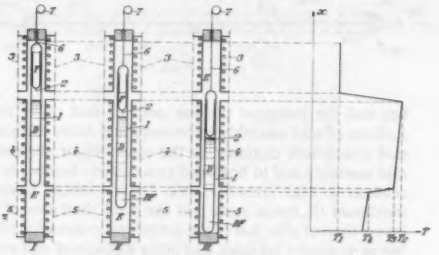
removing said film of binary silicate glass with a second etchant which does not etch silicon dioxide or the material of said layer.

4,040,894

PROCESS OF PREPARING CRYSTALS OF COMPOUNDS AND ALLOYS

Huguette Fumeron Rodot; Maurice Schneider, both of 1, Place Aristide Briand, 92 - Bellevue, France, and Arnost Hruby, Czechoslovak Academy of Science, Institute of Solid State Physics, Prague 6, Cukrovarnicka 10, Czechoslovakia

Continuation of Ser. No. 232,240, March 6, 1972, abandoned, which is a continuation of Ser. No. 841,667, June 13, 1968, abandoned. This application Nov. 27, 1974, Ser. No. 527,688
Claims priority, application France, June 13, 1967, 67.110074
Int. Cl.[2] B01J *12/26*
U.S. Cl. 156—609 **3 Claims**



1. A process of preparing large size crystals of substances which are compounds or alloys of at least two constituents at least one of which is relatively low volatility and one is of relatively high volatility comprising:

1. feeding continuously to the surface of a liquid phase solution which contains said components of low volatility, but does not contain said more volatile constituent, vapors of at least said component of high volatility from a source maintained at a constant temperature to vaporize and provide a vapor pressure on the surface of said liquid phase solution to continuously dissolve said vapors in said liquid so that all the constituents necessary to form said substance are then present in said solution; said process being carried out in a closed container containing said liquid phase in its one end and in its other end an interior container containing at least said component of high volatility;
2. simultaneously subjecting said liquid phase solution to a first slight temperature gradient zone in which zone the temperature is sufficiently high to maintain said liquid phase and in which the temperature gradient is sufficiently slight to ensure gradual and homogeneous diffusion of said substance formed at said surface through said solution, the temperature of the upper surface end of said zone being higher than the lower end thereof, allowing said liquid phase to reach saturation with said substance in the lower end only of said first temperature gradient zone;
3. maintaining a second steep temperature gradient zone located beneath said first temperature gradient zone in which the temperature is lower than in said temperature gradient zone;
4. crystallizing said substance at the level of the second gradient to form a solid-liquid interface;
5. ascertaining by the application of Fick's law when saturation of the liquid phase with said substance at said solid/-liquid interface is reached;
6. when said saturation is reached, moving said liquid phase relative to said first and second temperature gradients while maintaining the solid-liquid interface at the same

temperature and same composition within the second gradient by controlling the rate of relative movement at a speed ascertained by Fick's law and while maintaining the continuous feeding of vapor to the surface of said liquid phase; thereby

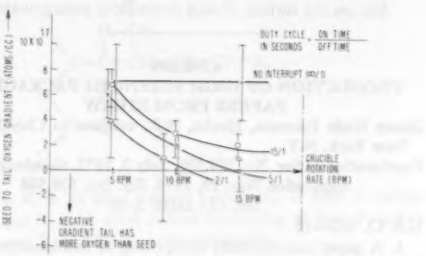
7. continuously forming and growing crystals of said substance at said interface.

4,040,895

CONTROL OF OXYGEN IN SILICON CRYSTALS

William John Patrick, Poughkeepsie, and Wolfgang Alfred Westdorp, Hopewell Junction, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 22, 1975, Ser. No. 624,618
Int. Cl.[2] B01J *17/18*; C01B *33/02*
U.S. Cl. 156—618 **4 Claims**



1. A process for controlling the oxygen content gradient in a silicon crystal, which is drawn from a melt of silicon contained in a silica crucible, comprising:

continuously rotating the crystal as it is drawn from the melt, while rotating the crucible in a direction opposite to the direction of crystal rotation with the rate of crucible rotation ranging from about 5 to 20 rpm; and

controlling the oxygen concentration of the melt during the crystal growing process by periodically stopping the rotation of the crucible, to create fluid shearing at the melt-crucible interface, in regular on time/off time duty cycles in which the on time and the off time each range from about 1 to 15 seconds with the duty cycles and the rate of crucible rotation being selected such that adverse effects on crystal quality do not occur while the oxygen concentration gradient in the silicon crystal is kept to about 4×10^{17} atoms/cc or less.

4,040,896

CHEMICAL POLISH FOR BaF_2 AND CaF_2

James A. Harrington, and Don A. Gregory, both of Huntsville, Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 15, 1976, Ser. No. 741,651
Int. Cl.[2] C23F *3/00*
U.S. Cl. 156—645 **3 Claims**

1. A method for producing high quality, low scattering surfaces on a crystal selected from the crystals consisting of BaF_2 and CaF_2, said crystals when selected having surface irregularities and imperfections on the surface thereof that are removed by said method to yield crystals with polished surfaces as required for use as laser windows and for use in calorimetry measurements, said method comprising the completion of a multi-stage mechanical polishing cycle that is repeated as required for removing surface irregularities and polishing said surfaces which produces crystal surfaces with no visible scratches at 280 magnification and said method comprising the completion of a chemical polishing cycle that is repeated as required to produce said high quality, low scattering surfaces on said crystals; said multi-stage mechanical polishing cycle comprising:

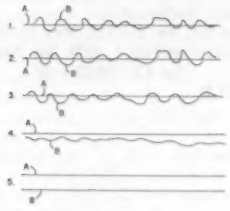
i. removing large imperfections from said crystal surface with sandpaper, beginning with 240 grit and eventually ending with 600 grit;

ii. polishing said crystal surface with a cloth covered rotating wheel using polishing compounds of decreasing particle size, said polishing compounds comprised substantially of diamond from grit size of about 1200 to about 100,000, said polishing beginning with about 1200 grit and eventually end with 100,000 grit which prepares said crystal surface for a final mechanical polishing cycle;

iii. completing a final mechanical polishing cycle by further polishing said crystal surface that has been polished with said polishing compounds comprised substantially of a cloth covered rotating wheel using aluminum oxide having decreasing particle sizes of about 5 micrometers, 0.5 micrometers, and 0.03 micrometers, said final mechanical polishing cycle repeated as required to produce a crystal surface with no visible scratches at 280 magnification, said mechanical polishing cycle preparing said crystal surface for said chemical polishing cycle that follows cleaning and drying crystal surface;

iv. cleaning said mechanically polished crystal surface with water to remove said polishing compound from said crystal surface;

v. drying said polished and cleaned crystal surface which further prepares said crystal surface for said chemical polishing cycle; and completing said chemical polishing cycle which comprises:



vi. lowering and positioning for a predetermined immersion time said mechanical polished, washed, and dried crystal surface into a container which contains a prepared polishing solution in sufficient amount for immersion of said crystal and comprised of from about 3.5 to about 4.5 parts of concentrated sulfuric acid mixed with from about 8 to about 10 parts of glacial acetic acid when said crystal selected is BaF_2 and said prepared solution comprised of from about 2.7 to about 3.3 parts of concentrated sulfuric acid mixed with from about 1.8 to about 2.2 parts of glacial acetic acid when said crystal selected is CaF_2, said lowering and positioning accomplished so that said mechanically polished, washed, and dried crystal surface has the polished sides perpendicular to the surface of said prepared solution, said predetermined immersion times being limited to approximately 16 minutes per immersion cycle for CaF_2 and to approximately several hours per immersion cycle for BaF_2, said predetermined immersion time per immersion cycle being based on an immersion time that will not etch the surfaces of said crystals;

vii. removing said chemically polished crystal from said prepared polishing solution, rinsing said chemically polished crystal with distilled water, and then drying said chemically polished crystal to complete said chemical polishing cycle.

4,040,897

ETCHANTS FOR GLASS FILMS ON METAL SUBSTRATES

Richard C. Blish, II, and Kyle Eugene Lemons, both of San Jose, Calif., assignors to Signetics Corporation, Sunnyvale, Calif.

Continuation of Ser. No. 574,503, May 5, 1975, abandoned. This application Nov. 10, 1976, Ser. No. 740,546

Int. Cl.[2] H01L *21/312*

U.S. Cl. 156—656 **7 Claims**

1. In a method of selectively etching a pyralytic glass layer on a metal substrate without substantially attacking the underlying metal, the step of contacting the glass layer with a dilute aqueous etch solution for a sufficient time to etch through the glass layer, said etch solution comprising buffered hydrofluoric acid, sodium chloride at a concentration from about 1% by weight of solution to the point just below saturation where the sodium chloride begins to precipiate, and a fluorocarbon surfactant capable of forming a thin protective film on the metal substrate, said etch solution being diluted with water.

4. In a method of selectively etching a pyralytic glass layer on a metal substrate without substantially attacking the underlying metal, the step of contacting the glass layer with a dilute aqueous etch solution for a sufficient time to etch through the glass layer, said etch solution comprising buffered hydrofluoric acid, sodium chloride at a concentration from about 1% by weight of solution to the point just below saturation where the sodium chloride begins to precipitate, and a 6-hydroxy alcohol, said etch solution being diluted with water.

4,040,898

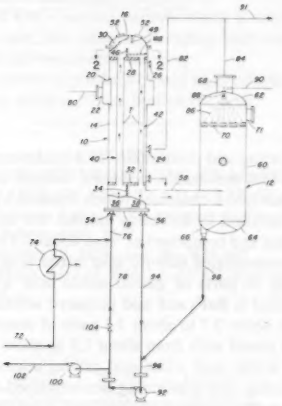
EVAPORATING APPARATUS AND PROCESS

Harlan P. Englander, Tonawanda, and Edward B. Pinkel, Buffalo, both of N.Y., assignors to Blaw-Knox Food and Chemical Equipment, Inc., Buffalo, N.Y.

Continuation of Ser. No. 254,427, May 18, 1972, abandoned. This application Feb. 4, 1976, Ser. No. 655,221

Int. Cl.[2] B01D *1/06*

U.S. Cl. 159—27 R **3 Claims**



1. A process for concentrating liquids by passing said liquids through a concentration zone defined by a plurality of upflow passageways and down-flow passageways, with said passages being in direct heat exchange relation with a source of heat, characterized by the steps of

a. passing the fresh liquids to be concentrated through said upflow passageways to form a first liquid-vapor phase;
b. withdrawing in a first withdrawing step said first liquid-vapor phase from the upper ends of said upflow passageways;
c. introducing said first liquid-vapor phase into the upper ends of said down-flow passageways;
d. said introducing step being carried out by passing said first liquid-vapor phase through orifices coaxial with said down-flow passageways;
e. said orifices being smaller in diameter than their related down-flow passageways;
f. withdrawing in a second withdrawing step a second liquid-vapor phase from the lower ends of said down-flow passageways;
g. separating said second liquid-vapor phase into a vapor phase and a liquid phase;
h. withdrawing a portion of said liquid phase as product;
i. recirculating the remainder of said liquid phase to said upflow passageways along with said fresh liquids;
j. visually monitoring said first withdrawing step to avoid pulsations in said first liquid-vapor phase; and
k. adjusting the rate of recirculation of said liquid phase from said separated second liquid-vapor phase in accordance with said monitoring step so as to maintain a continuous film on the surface of said down-flow passageways.

4,040,899

PRODUCTION OF HIGH STRENGTH PACKAGING PAPERS FROM STRAW

James Wade Emerson, Hazlet, N.J., assignor to Clupak, Inc., New York, N.Y.

Continuation of Ser. No. 268,508, July 3, 1972, abandoned. This application Nov. 29, 1974, Ser. No. 528,584

Int. Cl.[2] D21C *3/00*

U.S. Cl. 162—13 **7 Claims**

1. A paper constituently comprising in combination straw fiber of relatively short fiber length in the range of approximately 0.70 to 4.00 millimeters and relatively longer softwood fibers randomly and generally intermittently mixed with the straw fibers, the paper comprising at least 60% straw fiber with the balance of fibers comprising said relatively longer fibers, said paper having a basis weight of more than 55 pounds and having substantially all of its fiber laterally crimped and intertwined such that the paper exhibits substantial permanent extensibility in excess of the paper web as laid.

6. A straw paper suitable for use as high strength packaging paper and for making high strength multi-walled paper sacks, said paper comprising at least 40% by weight straw fiber and the remainder softwood pulp fiber, a majority of the straw fibers being in the range of approximately 0.70 to 4.00 millimeters in length, said straw fiber being randomly and generally uniformly mixed with said softwood pulp fiber, said paper having a basis weight of more than 55 pounds, substantially all of its fibers locally crimped and intertwined such that the paper has a percent elongation of at least 7.9 and substantial permanent extensibility in excess of the paper web as laid.

4,040,900

METHOD OF SIZING PAPER

Emil D. Mazzarella, Mountainside; Leonard J. Wood, Jr., Berkeley Heights, and Walter Maliczyszyn, Piscataway, all of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Continuation-in-part of Ser. No. 535,443, Dec. 23, 1974, abandoned, which is a continuation-in-part of Ser. No. 471,230, May 20, 1974, abandoned. This application May 5, 1976, Ser. No. 683,405

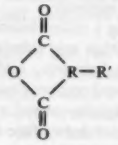
Int. Cl.[2] D21D *3/00*

U.S. Cl. 162—158 **7 Claims**

1. A method for sizing paper products comprising the steps of

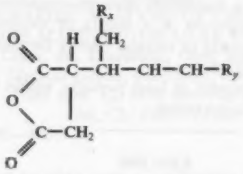
1. providing a paper stock system;
2. forming, in the absence of high shearing forces and under normal pressures, a sizing emulsion consisting essentially of:
   a. from 80 to 97 parts of substituted cyclic dicarboxylic acid anhydride corresponding to the formula

(A)



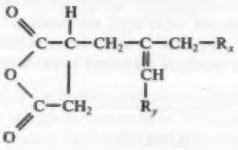
wherein R represents a dimethylene or trimethylene radical and wherein R′ is a hydrophobic group containing more than 5 carbon atoms which may be selected from the class consisting of alkyl, alkenyl, aralkyl, or aralkenyl groups;

(B)



wherein R_x is an alkyl radical containing at least 4 carbon atoms and R_y is an alkyl radical containing at least 4 carbon atoms, and R_x and R_y are interchangeable;

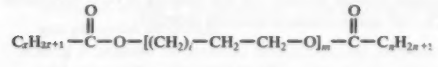
(C)



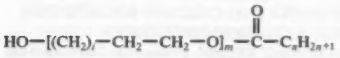
wherein R_x is an alkyl radical containing at least 5 carbon atoms and R_y is an alkyl radical containing at least 5 carbon atoms and R_x and R_y are interchangeable;

b. from 3 to 20 parts of a polyoxyalkylene alkyl or polyoxyalkylene alkyl-aryl ether or the corresponding mono- or diester selected from the group consisting of:

i)



ii)



wherein *x* and *n* are integers in the range of 8 to 20; R is an aryl radical; *m* is an integer in the range of 5 to 20; and *i* is 0 or 1; and

3. forming a web from the paper stock system; change c. water;

4. intimately dispersing said emulsion within the paper stock either before or after formation of said web but prior to passing said web through the drying stage of the paper making operation in an amount sufficient to provide a concentration of the substituted cyclic dicarboxylic acid anhydride of from 0.1 to 2.0%, based on dry fiber weight.

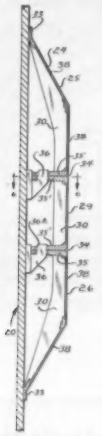
6. The method of claim **1** wherein there is dispersed within the paper stock prior to the conversion of the paper stock into a dry web at least 0.01%, based on dry fiber weight, of a cationic retention agent.

4,040,901

MOUNTING FOR SECTIONAL SCREEN

Everett R. Leisure, Portland, Oreg., assignor to Esco Corporation, Portland, Oreg.

Filed Aug. 16, 1976, Ser. No. 714,517
Int. Cl.[2] D21C *7/00*; B01D *25/02*
U.S. Cl. 162—251 **7 Claims**



1. In combination with the interior wall of a vessel, a sectional screen mounted thereon, each section comprising a frame which is generally rectangular in front elevation to provide a pair of vertical edges and first and second horizontal edges, said vertical edges being generally arcuate in side elevation to position said first horizontal edge adjacent the vessel wall and said second horizontal edge spaced from said wall, and hook receiving means on said frame adjacent said second horizontal edge and extending toward said wall for supporting and stabilizing said section in place, said sections being arranged in a plurality of pairs, the sections in each pair being vertically related to position said first horizontal edge of the lower section downwardly and said first horizontal edge of the upper section upwardly, said second horizontal edges of each pair being in abutting relation to position the hook receiving means of each section of each pair in abutting, aligned relation, and a single hook means on said wall engaging said hook receiving means and passing through the openings in the aligned hook-receiving means of each pair.

4,040,902

METHOD FOR AXIALLY SHUFFLING FUEL ELEMENTS IN A NUCLEAR REACTOR

Karol J. Mysels, La Jolla, Calif., assignor to General Atomic Company, San Diego, Calif.

Filed Apr. 3, 1975, Ser. No. 564,773
Int. Cl.[2] G21C *19/00*
U.S. Cl. 176—30 **10 Claims**

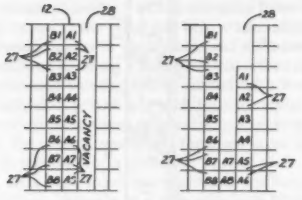
1. A method of refueling the fuel columns in the active core of a nuclear reactor having upper and lower ends and including fuel columns comprised of substantially equal stacks of fuel elements having hexagonal transverse configurations, said method comprising the steps of:

a. completely removing a predetermined number of adjoining fuel columns to initially create a plurality of adjoining vacant columns;

b. filling one of said vacant columns with at least one fresh hexagonal shaped fuel element, and a plurality of complementary hexagonal shaped fuel elements transferred from a single fuel column adjoining at least one of said vacant columns by laterally transferring said plurality of complementary fuel elements as a unit to said one of said vacant

columns through adjoining column vacancies by substantially lateral movement so as to maintain their same relative stack positions during said transferring and without lifting or lowering the major portion of any of said fuel elements beyond the upper or lower bounds of the active core during said transferring;

c. discarding a number of fuel elements from said single adjoining fuel column equal to the number of said fresh



fuel elements placed in said one of said vacant columns to thus create a new vacant column;

d. repeating steps b and c until all of said fuel columns in said active core have been refueled except a number of finally remaining vacant columns equal to the number of initially created vacant columns; and

e. refilling said remaining vacant columns with a number of hexagonal shaped fuel elements as necessary to establish full fuel columns.

4,040,903

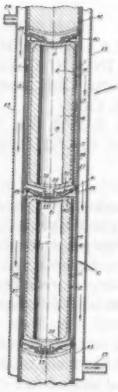
THERMIONIC ENERGY CONVERTERS

James E. Monroe, Jr., Timonium, Md., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Continuation of Ser. No. 384,080, July 21, 1964. This application Sept. 3, 1974, Ser. No. 502,420

Int. Cl.[2] G21C *3/02*

U.S. Cl. 176—39 **2 Claims**



1. A thermionic device for the conversion into electrical energy of nuclear energy released by a fissionable material comprising:

a tubular anode formed of niobium;

a cylindrical cathode having a sealed interior chamber positioned concentrically within said tubular anode with an interelectrode gap therebetween, said cathode being formed of a refractory metal composition consisting essentially of a mixture of molybdenum and approximately ½% titanium and having on its outer surface an emitter coating of ruthenium;

a nuclear fuel solid of annular configuration with an axial void on the centerline thereof bonded metallurgically to the interior of said cathode and partially filling said sealed interior chamber, said axial void being evacuated for the collection and containment of fission product gases within said interior chamber, said fuel solid consisting essentially of particles of a fissionable material-containing ceramic composition dispersed in a matrix of molybdenum to promote the transfer of thermal energy through said fuel solid to said cathode; and

a cesium vapor located at least partially within said interelectrode gap in operation.

4,040,904

NOVEL RABIES VIRUS VACCINE AND PROCESSES

Eban A. Slater, 1 Lindenwood Lane, St. Joseph, Mo. 64505

Filed July 21, 1975, Ser. No. 597,654

Int. Cl.[2] C12K *7/00*; A61K *39/28*

U.S. Cl. 195—1.3 **5 Claims**

1. A method for the preparation of a novel live rabies virus strain which exhibits reproducibly significant cytopathic effect which correlates with the virus titer, said method comprising passing the ERA strain rabies virus in tissue culture of PK_2A cells for a number of passages sufficient to develop said novel strain.

4,040,905

SUB-HUMAN PRIMATE DIPLOID CELL LINES AS SUBSTRATES FOR VIRUS VACCINE PRODUCTION

John C. Petricciani, Washington, D.C.; Hope E. Hopps, Silver Spring; Douglas E. Lorenz, Bethesda, both of Md.; Paul J. Vasington, and Roslyn E. Wallace, both of Pearl River, N.Y., assignors to The United States Government, Washington, D.C.

Filed Oct. 27, 1971, Ser. No. 193,176

Int. Cl.[2] C12K *9/00*

U.S. Cl. 195—1.8 **1 Claim**

1. A cell culture for virus vaccine production comprising a sub-human primate diploid cell line bearing ATCC Accession No. CL-160 and a nutrient medium therefor.

4,040,906

METHOD OF PRODUCING CARBON SOURCE FOR CITRIC ACID FERMENTATION

Ryosuke Uchio, Zushi; Kenji Kikuchi, Yokosuka; Soichiro Asai, Tokyo, and Kenichi Yarita, Yokohama, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Filed Apr. 23, 1976, Ser. No. 679,711

Int. Cl.[2] C12D *1/04*; C12B *3/04*

U.S. Cl. 195—36 R **5 Claims**

1. In the fermentation production of citric acid wherein fermentation is effected by the use of a microorganism of the species *Aspergillus niger* or *Aspergillus awamori*, the improvement which comprises:

admixing a substantially neutral hydrolyzate of juices of cane or beet, crude sugar, or molasses containing glucose and fructose cooled to below 10° C with calcium hydroxide to form a fructose addition product precipitate, and

neutralizing the remaining mother liquor, simultaneously eliminating calcium ions therefrom, and utilizing the remaining liquor as the carbon source for said fermentation.

4,040,907

IODOTHYRONINE ENZYME CONJUGATES

Edwin F. Ullman, Atherton, and Kenneth E. Rubenstein, Menlo Park, both of Calif., assignors to Syva Company, Palo Alto, Calif.

Continuation-in-part of Ser. No. 481,023, June 20, 1974, Pat. No. 3,975,237, which is a division of Ser. No. 304,157, Nov. 6, 1972, Pat. No. 3,852,157, which is a continuation-in-part of Ser. No. 143,609, May 14, 1971, abandoned. This application Dec. 29, 1975, Ser. No. 644,489

Int. Cl.[2] C07G 7/02

U.S. Cl. 195—63 16 Claims

11. A thyroxine conjugate to an enzyme at other than the active site of the enzyme, having on the average from about 1 to 20 of said thyroxine bonded to said enzyme.

4,040,908

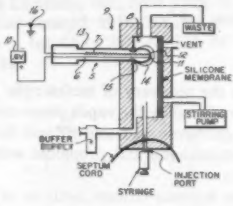
POLAROGRAPHIC ANALYSIS OF CHOLESTEROL AND OTHER MACROMOLECULAR SUBSTANCES

Leland C. Clark, Jr., Cincinnati, Ohio, assignor to Children's Hospital Medical Center, Cincinnati, Ohio

Filed Mar. 12, 1976, Ser. No. 666,252

Int. Cl.[2] G01N 31/14

U.S. Cl. 195—103.5 R 23 Claims



1. A method for quantitative polarographic determination of a substance which is convertible by at least one enzyme to produce ultimately hydrogen peroxide comprising the steps of

providing a polarographic cell including at least one electrode sensitive to hydrogen peroxide positioned behind a membrane permeable to hydrogen peroxide and impermeable to said substance being measured, said cell containing an electrolyte,

at least one enzyme contained in said cell on the side of the membrane opposite said electrode for enzymatic reaction with said substance to produce ultimately hydrogen peroxide,

establishing a potential across said cell such that current is produced which is proportional to the amount of hydrogen peroxide produced,

adding a quantity of material containing said substance for said enzymatic reaction on the side of the membrane opposite said electrode and to effect diffusion of at least a portion of said hydrogen peroxide into said membrane and into contact with said electrode, and

determining the current flowing across said cell as a function of the amount of hydrogen peroxide formed and as an indication of the amount of said substance in said material.

4,040,909

DIAGNOSTIC DEVICE FOR A LIQUID SAMPLE

Gary Libman, Des Plaines, and Frank K. Villari, Oak Park, both of Ill., assignors to The Kendall Company, Boston, Mass.

Division of Ser. No. 495,978, Aug. 29, 1974, Pat. No. 3,952,729. This application Nov. 21, 1975, Ser. No. 634,110

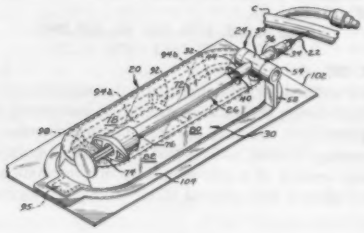
Int. Cl.[2] C12K 1/10

U.S. Cl. 195—127 2 Claims

1. A diagnostic device for a source of liquid sample, comprising:

an elongated receptacle having a culture medium longitudinally disposed in a generally planar configuration along a wall of the receptacle;

pump means connected intermediate the source and receptacle;



means in addition to the pump means for directing the sample from the pump means into the receptacle only adjacent one end of said medium for passage along the medium; and

an absorbent pad located adjacent the other end of the medium remote from the directing means to capture and retain excess liquid.

4,040,910

APPARATUS FOR CHARGING COKE OVENS

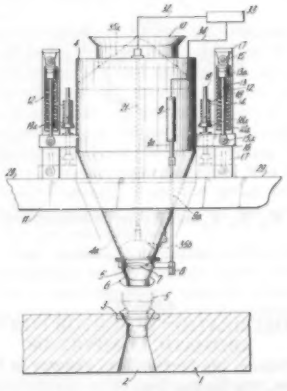
Johannes Knappstein, and Josef Stratmann, both of Recklinghausen, Germany, assignors to Firma Carl Still, Germany

Filed May 10, 1976, Ser. No. 684,572

Claims priority, application Germany, June 3, 1975, 2524462

Int. Cl.[2] C10B 31/04

U.S. Cl. 202—262 13 Claims



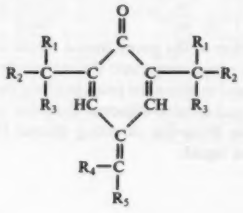
1. An apparatus for charging coke ovens with coal through filling openings in the oven roof, comprising a hopper support positionable over the filling openings, at least one charging hopper adapted to be filled with coal and having a bottom discharge connection engageable in a filling opening, means on said support supporting said hopper for upward and downward movement, and drive means on said support connected to said hopper to move said hopper downwardly to engage said discharge connection into the associated oven filling opening to discharge the coal from said hopper into the oven and to raise said hopper after discharging is completed.

4,040,911
PROCESS FOR INHIBITING THE POLYMERIZATION OF STYRENE

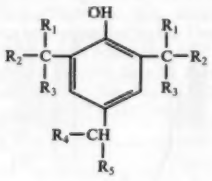
John D. Bacha, and Charles M. Selwitz, both of Monroeville, Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Jan. 2, 1976, Ser. No. 646,399
Int. Cl.[2] B01D 3/10; C07C 15/10
U.S. Cl. 203—9 6 Claims

1. In a method for inhibiting the polymerization of styrene monomers during the vacuum distillation processing thereof, the improvement which comprises a continuous mass process for preparing styrene, adding said processing a polymerizing inhibiting amount of a quinone alkide in combination with a hindered phenol, said quinone alkide having the formula:



wherein R_1, R_2 and R_3 are either alike or different, members selected from the group consisting of hydrogen, straight or branched chain members selected from alkyl moieties having from 1 to 8 carbon atoms, phenyl and alkyl substituted phenyl moieties having up to 9 carbon atoms, cyclic hydrocarbon moieties having from 3 to 5 carbon atoms; and wherein R_4 and R_5 are either alike or different, members selected from the group consisting of hydrogen, straight or branched chain alkyl moieties having from 1 to 18 carbon atoms, phenyl and alkyl substituted phenyl moieties having 9 carbon atoms, and cyclic hydrocarbon moieties having from 3 to 5 carbon atoms; and said phenol having the formula:



wherein R_1, R_2, R_3, R_4 and R_5 are defined above.

4,040,912
POLYMERIZATION INHIBITOR FOR VINYL AROMATIC COMPOUNDS

James M. Watson, Big Spring, Tex., assignor to Cosden Technology, Inc., Big Spring, Tex.

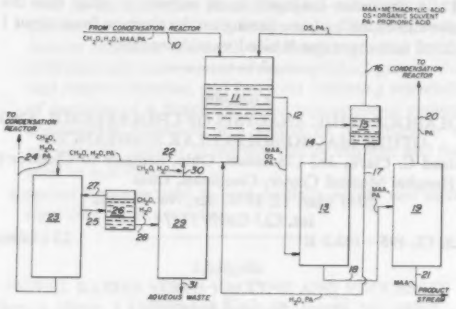
Filed Dec. 9, 1974, Ser. No. 531,066
Int. Cl.[2] B01D 3/34; C07C 7/00
U.S. Cl. 203—9 7 Claims

1. A process for the distillation of a readily polymerizable vinyl aromatic compound, which comprises subjecting said component to distillation conditions in a distillation system and adding to said system a polymerization inhibitor comprising an adduct of nitric oxide gas and styrene, said adduct of nitric oxide gas and styrene being present in an amount of from about 50 to 3000 ppm based upon the contents of the distillation system, whereby polymerization of the vinyl aromatic compound in the distillation system is substantially inhibited.

4,040,913
RECOVERY OF METHACRYLIC ACID FROM THE EFFLUENT OBTAINED FROM THE CONDENSATION OF FORMALDEHYDE AND PROPIONIC ACID

James S. Clovis, Morrisville; Jerome Dohling, Huntingdon Valley, both of Pa., and Francis J. Nicastro, Cherry Hill, N.J., assignors to Rohm and Haas Company, Philadelphia, Pa.

Filed Sept. 2, 1975, Ser. No. 609,337
Int. Cl.[2] B01D 3/34; C07C 57/04
U.S. Cl. 203—69 13 Claims



1. A process for the recovery of methacrylic acid from an aqueous effluent produced by the vapor phase condensation of formaldehyde and propionic acid, said effluent further containing unreacted formaldehyde and propionic acid, where the recovery comprises:

a. contacting the aqueous effluent with an organic solvent having a high extractive efficiency for methacrylic acid, a low extractive efficiency for formaldehyde and water and capable of preferentially extracting and azeotroping with propionic acid, to obtain an organic layer and an aqueous raffinate;

b. distilling the organic layer obtained in step (a) to azeotropically remove about 50-100% of the unreacted propionic acid extracted by the organic solvent and to strip off the organic solvent, leaving as bottoms a mixture of methacrylic acid and remaining unreacted propionic acid;

c. distilling the bottoms of step (b) to obtain any remaining propionic acid overhead and pure methacrylic acid as bottoms;

d. azeotropically distilling the aqueous raffinate of step (a) with an entrainer to obtain water and formaldehyde overhead and formaldehyde/propionic acid bottoms.

e. sending the overhead of step d) to a separator to allow entrainer to separate from the water/formaldehyde taken overhead; and

f. distilling the water/formaldehyde overhead obtained in step e. to concentrate the formaldehyde for recycle to step d), while disposing of the aqueous bottoms as organic waste.

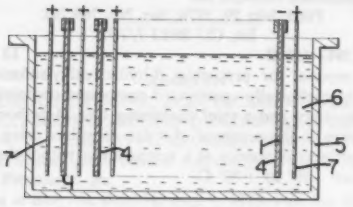
4,040,914
CATHODE STARTING BLANKS FOR METAL DEPOSITION

Antonio Nidola; Placido M. Spaziante, both of Milan, Italy, and Vittorio de Nora, Nassau, Bahamas, assignors to Diamond Shamrock Technologies S.A., Geneva, Switzerland

Filed Apr. 28, 1976, Ser. No. 680,982
Int. Cl.[2] C25D 1/20; C25C 7/08; C25B 11/10
U.S. Cl. 204—12 19 Claims

16. In the method of electrolytically depositing a strippable metal layer on a cathode starting blank from a metal containing electrolyte and stripping the metal deposit from the blank, the

improvement wherein the cathode starting blank comprises a valve metal base coated over at least a portion of its surface



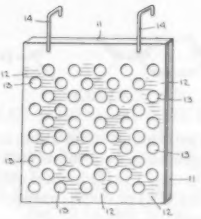
with a thin layer containing a material selected from the group consisting of silver, silver-valve metal alloy and oxides thereof.

4,040,915

METHOD FOR PRODUCING REGULAR ELECTRONICKEL OR S NICKEL ROUNDS FROM ELECTROPLATING BATHS GIVING HIGHLY STRESSED DEPOSITS

Gordon Lloyd Fisher, Mahwah, N.J., assignor to The International Nickel Company, Inc., New York, N.Y.

Filed June 15, 1976, Ser. No. 696,209
Int. Cl.[2] C25D *1/10, 1/20*
U.S. Cl. 204—12 **7 Claims**



1. A permanent reuseable mandrel for electrodeposition of discrete electrodeposits of metal having a high internal stress as deposited comprising and essentially flat plate of metal resistant to the corrosive environment of a metal electrodeposition bath and adapted to be suspended in such a bath in contact as a cathode with an electrical energizing means, said flat plate being masked with an adherent electrical resist to define islands of bare metal on the surface of said plate, each of said islands having a major lateral dimension of about 7 to about 50 mm and having a continuous non-undercut recess in the bare metal surface thereof adjacent to and parallel to the perimeter of each of said islands, said recess being about 0.12 mm to about 1.6 mm in depth with the ratio of lateral dimension to depth of recess being about 5 to 50.

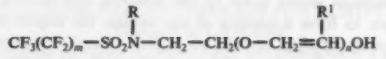
4,040,916

ZINC PLATING BATH AND METHOD OF FORMING A NON-DENDRITIC ZINC LAYER

Fritz G. Will, and Fred F. Holub, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 636,204, Nov. 28, 1975, abandoned. This application Aug. 18, 1976, Ser. No. 715,226
Int. Cl.[2] C25D *3/22*; H01M *10/26*
U.S. Cl. 204—55 R **10 Claims**

1. A method for forming a non-dendritic zinc layer which comprises providing a deposition solution containing a zinc compound and from 0.001 to 10 weight percent of a non-ionic surfactant additive which has the formula:



where *m* is a number from 3 to 15, R is alkyl radical having from 1 to 10 carbon atoms, R^1 is a member of a group consisting of hydrogen and methyl radical, *n* is a number for the group from 0 to 30, and the surfactant additive has a molecular weight range of approximately 550–1500; positioning a pair of spaced apart electrodes within the deposition solution, applying an electric current to the electrodes, and depositing a non-dendritic zinc layer on the negative electrode.

4,040,917

PREPARATION OF INTERCALATED CHALCOGENIDES

M. Stanley Whittingham, Fanwood, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 592,592, July 2, 1975, abandoned, which is a continuation-in-part of Ser. No. 396,001, Sept. 10, 1973, abandoned. This application Apr. 5, 1976, Ser. No. 673,695
Int. Cl.[2] C25B *1/00*
U.S. Cl. 204—92 **18 Claims**

1. A process for the preparation of intercalated chalcogenides which comprises applying a current to a system comprising:

a. a cathode containing as the cathode-active material the chalcogenide to be intercalated, said chalcogenide having a layered structure and having the fomrula MZ_x wherein M is at least one metal selected from the group consisting of titanium, zirconium, hafnium, vanadium, niobium, tantalum and molybdenum; Z is at least one chalcogen selected from the group consisting of sulfur, selenium and tellurium; and *x* has a numerical value between about 1 and about 2.05;

b. an anode containing as the anode-active material an electronically conductive material selected from the group consisting of Group IVb metals, Group Vb metals, Group VIb metals, Group VIIb metals, Group VIII metals and electronically conductive compounds of the aforesaid metals; and

c. an electrolyte comprising an ionically conductive material which will provide the cathode with ions of the species which are to intercalate the chalcogenide, said electrolyte having the formula LX wherein L is the intercalating species and is at least one cationic moiety selected from the group consisting of Group Ia metals, Group Ib metals, Group IIa metals, Group IIb metals, Group IIIa metals, ammonium and substituted ammonium; X is at least one anionic moiety selected from the group consisting of halides, sulfates, nitrates, beta-alumina, phosphofluorides, thiocyanates and perchlorates,

said current being applied at a voltage sufficiently high to cause the intercalation of the cathode active material and sufficiently low to avoid deposition onto the chalcogenide of the species being intercalated into the chalcogenide.

4,040,918

METHOD OF ACTIVATING AN ANODE

Harlan B. Johnson, Rittman; Aleksandrs Martinsons, Wadsworth, and John O. Snodgrass, Akron, all of Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Feb. 26, 1976, Ser. No. 661,582
Int. Cl.[2] C25B *1/34, 11/08, 11/10*
U.S. Cl. 204—98 **6 Claims**

1. In a method of electrolyzing an alkali metal chloride brine comprising passing an electrical current from an anode through said brine to a cathode, evolving chlorine at an overvoltage on said anode, said anode having a surface coating comprising an oxide of a film-forming metal and an oxide of a platinum group metal on a metal substrate, said surface coating

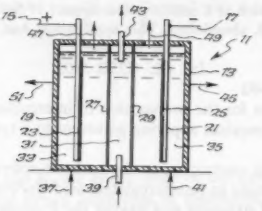
formed by applying compounds of said film-forming metal and said platinum group metal to the substrate and heating said substrate to form a coating of the oxides, the improvement comprising abrading an external portion of said oxide coating whereby to reduce the initial overvoltage of said anode.

4,040,919

VOLTAGE REDUCTION OF MEMBRANE CELL FOR THE ELECTROLYSIS OF BRINE

Jeffrey D. Eng, N. Vancouver, Canada, assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Continuation of Ser. No. 518,903, Oct. 29, 1974, abandoned.
This application Feb. 11, 1976, Ser. No. 657,134
Int. Cl.[2] C25B *1/16, 1/26, 13/00*
U.S. Cl. 204—98 **9 Claims**



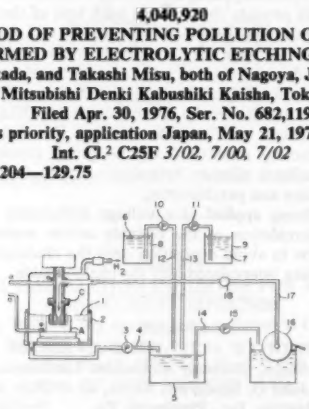
1. In the electrolysis of brine in a membrane cell, the improvement which comprises lowering the voltage drop across the cell by dissolving deposits upon the membrane by increasing the acidity of the anolyte, diluting the electrolyte located immediately adjacent to said anolyte and separated from said anolyte by a membrane, reducing the current density, and maintaining such conditions during electrolysis for a period sufficiently long to rejuvenate said membrane.

4,040,920

METHOD OF PREVENTING POLLUTION OF SLUDGE FORMED BY ELECTROLYTIC ETCHING WORK

Koji Takada, and Takashi Misu, both of Nagoya, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 30, 1976, Ser. No. 682,119
Claims priority, application Japan, May 21, 1975, 50-59669
Int. Cl.[2] C25F *3/02, 7/00, 7/02*
U.S. Cl. 204—129.75 **6 Claims**



1. A method of preventing pollution of a sludge formed by an electrolytic etching work which comprises admixing an aqueous solution of ferrous nitrate or ferrous chloride to an electrolytic solution which is recycled, at a ratio of more than stoichiometric amount of ferrous nitrate or ferrous chloride to chromium (VI) compound and adjusting pH of the mixture to 8 to 8.5 by adding an aqueous solution of sodium hydroxide, and separating a sludge formed by the neutralization.

4,040,921

PROCESS FOR BETA-HYDROXYALKYLSULFOXIDES

Ellis K. Fields, River Forest, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed July 29, 1976, Ser. No. 709,781
Int. Cl.[2] B01J *1/10*
U.S. Cl. 204—158 R **13 Claims**

1. A process for preparing β-hydroxyalkylsufoxides by reacting an olefinically unsaturated compound containing 2 to 30 carbon atoms and a thiol containing 1 to 24 carbon atoms with oxygen in the presence of a dye sensitizer using visible light as an energy source at a temperature within the range from about $-10°$ to $+70°$ C.

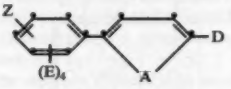
4,040,922

PHOTOPOLYMERIZABLE POLYMERIC COMPOSITIONS CONTAINING HALOGEN CONTAINING HETEROCYCLIC COMPOUND

Richard H. S. Wang; Gordon C. Newland, and James G. Pacifici, all of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 6, 1975, Ser. No. 620,100
Int. Cl.[2] C08F *2/46, 4/00*
U.S. Cl. 204—159.15 **13 Claims**

1. A composition capable of forming coatings hardenable by ultraviolet radiation comprising a mixture of a photopolymerizable or photocrosslinkable ethylenically unsaturated compound and from 0.01 to 10% by weight of a photoinitiator selected from the group consisting of compounds having the formula



wherein A is an oxygen atom, a sulfur atom, or a nitrogen atom containing a hydrogen atom or a substituted or unsubstituted lower alkyl group having 1 to 12 carbon atoms;

Z is a $—CH_2X$, $—CHX_2$ or $—CX_3$ group;

X is a halogen atom;

E is hydrogen, halogen, alkyl, alkoxy, aryl, aryloxy, hydroxy, amino, carbonylalkoxy or cyano; and

D is alkyl, substituted alkyl, aryl or substituted arly group.

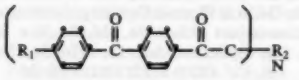
4,040,923

PHOTOPOLYMERIZABLE POLYMERIC COMPOSITIONS CONTAINING HALOGEN CONTAINING AROMATIC KETONES

James G. Pacifici; Gordon C. Newland, both of Kingsport, and Hobert M. Beard, Jr., Johnson City, all of Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed June 3, 1976, Ser. No. 692,403
Int. Cl.[2] C08F *8/00, 2/46*
U.S. Cl. 204—159.15 **30 Claims**

1. A composition capable of forming coatings hardenable by ultraviolet radiation comprising a mixture of a photopolymerizable or photocrosslinkable ethylenically unsaturated compound and from 0.01 to 10% by weight of a photoinitiator selected from the group consisting of aryl ketone compounds having the formula



wherein R_1 is $—CH_2X$, $—CHX_2$, and $—CX_3$, where X is chlorine or bromine, N is an integer and is equivalent to the valence of R_2, and R_2 is monovalent lower alkyl containing 1 to 10 carbon atoms, a polyvalent alkylene group of the formula

C_xH_{2x-y} in which x is 2 to 10 and y is 0 to 2, a cycloalkylene group or aryl group containing 6 carbon atoms.

4,040,924

AQUEOUS CATIONIC ELECTRODEPOSITION OF EPOXY RESINS HAVING QUATERNARY GROUPS CARRYING BLOCKED NCO

James E. Jones, Lower Burrell, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 601,111, Aug. 1, 1975, Pat. No. 4,009,133. This application Nov. 1, 1976, Ser. No. 737,359

Int. Cl.[2] C25D *13/06*; C08F *8/30, 8/34*; C08G *18/58*

U.S. Cl. 204—181 6 Claims

1. A method of electrocoating an electrically conductive surface serving as a cathode in an electrical circuit comprising said cathode and an anode and an aqueous electrodepositable composition wherein the electrodepositable composition comprises an aqueous dispersion of:

A. a hydroxyl group-containing resinous vehicle comprising the acidified reaction product of:

1. an organic polyepoxide,

2. an organic tertiary amine which contains blocked isocyanate groups or organic thioether which contains blocked isocyanate groups, said blocked isocyanate groups capable of unblocking at elevated temperature to crosslink said resinous vehicle.

4,040,925

ULTRAVIOLET CURING OF ELECTROCOATING COMPOSITIONS

Vincent D. McGinniss, Valley City, Ohio, assignor to SCM Corporation, New York, N.Y.

Filed May 2, 1974, Ser. No. 466,127

Int. Cl.[2] C25D *13/06*

U.S. Cl. 204—181 3 Claims

1. In a process for electrocoating a paint film onto an anode substrate dispersed within an aqueous electrocoating bath, the electrocoating composition being dispersed in water and comprising an ethylenically unsaturated polymer containing ethylenically unsaturated groups selected from acrylyl, acrylamide, and allyl, said ethylenically unsaturated polymer having a carboxylic group functionality and an acid number of at least about 20, said ethylenically unsaturated polymer being solubilized in water by reacting said polymer with at least about 1% by weight of a solubilizing derivative selected from aliphatic amines, aromatic amines, alkynolamines, sodium hydroxide and potassium hydroxide, and electrocoating said polymer onto the anode substrate to form a film thereon, the improvement comprising:

reacting at least about 2% by weight of an ultraviolet sensitizer with said polymer to attach the ultraviolet sensitizer to the polymer structure, said ultraviolet sensitizer being reacted onto the polymer structure prior to the step of neutralizing the polymer and prior to dispersing the polymer into the electrocoating water bath;

electrocoating said polymer containing the ultraviolet sensitizer connected to the polymer structure onto the anode substrate wherein the ultraviolet sensitizer remains tied to the polymer structure while electrocoating a polymeric film onto the anode substrate; and

exposing said polymeric film to ultraviolet energy to activate the ultraviolet sensitizer connected to the polymer structure and cross-link the ethylenic unsaturation in the polymer structure to provide a cured paint film on the anode substrate.

4,040,926

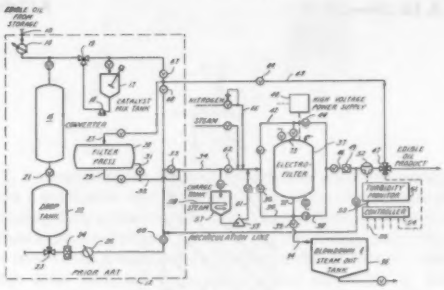
ELECTROFILTRATION PROCESS FOR PURIFYING ORGANIC LIQUIDS

Serafin Bess Oberton, Missouri City, Tex., assignor to Petrolite Corporation, St. Louis, Mo.

Filed Nov. 28, 1975, Ser. No. 636,261

Int. Cl.[2] B03C *5/00*

U.S. Cl. 204—186 40 Claims



1. An electrofiltration process for removing hydrogenation catalyst and other undissolved solids from a stream of edible oil which has been subjected to catalytic hydrogenation, and process comprising:

a. providing the stream of so hydrogenated edible oil at a sufficient temperature that organic solids such as stearine are in solution and cannot plug an electrofilter bed adapted to remove the undissolved solids carried therein;

b. passing said stream of oil through a chemically inert bed having multitudinous flow channels between rigid masses of a solid material having a dielectric constant not in excess of about 7;

c. establishing a d.c. electrical field within said bed having an intensity sufficient for removing the undissolved solids from said stream of oil by electrically induced adhesion of the solids in said bed material;

d. removing the purified oil stream with reduced undissolved solids content from said bed; and

e. cleaning at selected intervals at least a portion of said material of adhering solids by interruption of said electrical field, passing a cleaning fluid to remove adhering solids from said material and removing the fluid with the removed solids from said material.

4,040,927

CADMIUM TELLURITE THIN FILMS

John H. Chaffin, III, Minnetonka, and Richard A. Skogman, Inver Grove Heights, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Nov. 19, 1975, Ser. No. 633,532

Int. Cl.[2] C23C *15/00*

U.S. Cl. 204—192 S 4 Claims

1. A method of depositing a layer of a cadmium-tellurium-oxygen compound, the method comprising:

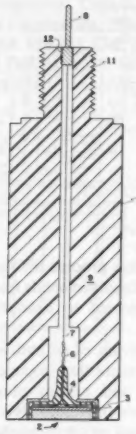
providing a substrate; and

sputter depositing the cadmium-tellurium-oxygen compound onto the substrate by sputter depositing from a cadmium telluride target in an oxygen atmosphere.

4,040,928
SPECIFIC ION SENSOR AND METHOD OF MANUFACTURE

Walter R. Kraus, Centerville; David J. Kelch, Bellbrook, and Gerald A. Jensen, Kettering, all of Ohio, assignors to The Mead Corporation, Dayton, Ohio

Continuation-in-part of Ser. No. 235,055, March 16, 1972, abandoned. This application July 10, 1973, Ser. No. 378,025
Int. Cl.[2] G01N *27/46*
U.S. Cl. 204—195 M 9 Claims



1. A specific ion sensor comprising:
a. a housing,
b. a membrane mounted in said housing, said membrane being produced by placing a layer of powdered specific ion sensing material selected from the class consisting of silver sulfide and silver bromide in a die in contact with a layer of powdered metallic silver and pressing said powder layers into a solid, impervious and intimately bonded mass with the silver portion thereof having an average thickness ranging between about 15 and 500 microns; the mounting of said membrane being such that said ion sensing material faces outwardly for contact with a process solution and said silver layer is electrically isolated from the exterior of the housing,
c. an electrical terminal mounted in said housing for delivering a signal to an external instrument, and
d. solid electrical connection means between said silver layer and said terminal.

4,040,929
OXYGEN SENSOR HAVING THIN FILM ELECTROLYTE

Carl F. Bauer, Chicago; Lawrence B. Welsh, Evanston, both of Ill.; Karl J. Youtsey, Decatur, Ala., and Frank R. Szofran, Des Plaines, Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

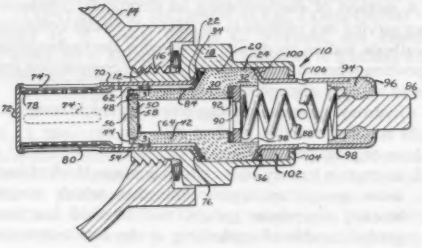
Filed Sept. 15, 1975, Ser. No. 613,657
Int. Cl.[2] G01N *27/46, 27/58*
U.S. Cl. 204—195 S 13 Claims

1. A thin film oxygen sensor comprising a substrate; a reference electrode coating on the substrate; an oxide-electrode interface region; a thin film layer of solid electrolyte having a thickness of less than about 1.5 μm; and a porous measuring electrode coating on the electrolyte; said oxide-electrode interface region being positioned between and in intimate contact with said reference electrode coating and said solid electrolyte so as to provide a stable reference oxygen partial pressure at the reference electrode.

4,040,930
OXYGEN SENSOR

James E. Dillon, Elgin, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Feb. 5, 1976, Ser. No. 655,662
Int. Cl.[2] G01N *27/46*
U.S. Cl. 204—195 S 7 Claims



1. An oxygen sensor for use in an automotive exhaust stream comprising a metal housing having a shouldered recess portion intermediate its ends, fastening means on the inner end of said metal housing adapted to cooperate with complementary fastening means on the side wall of an exhaust member containing gases to be sensed, a hollow, generally tubular, ceramic insulating body positioned within said metal housing and having an enlarged diameter shoulder portion intermediate its ends which is restrained against forward movement toward said inner end of said metal housing by said shouldered recess portion, the forward portion of said insulating body being unsupported and radially spaced from the inner wall of said metal housing, a solid electrolyte member of a material different from the ceramic body sealed to said ceramic insulating body at the inner end thereof and having electrodes on the opposed sides thereof, the combined length of the forward portion of said insulating body and said solid electrolyte member being less than 150% of the outer diameter of said forward portion, said solid electrolyte member being positioned axially at about the inner end of said metal housing, a generally tubular, apertured metal shield member extending axially from said metal housing a sufficient distance that its inner end will be in or near the center of the exhaust stream when said sensor is mounted in the side wall of an exhaust conduit.

4,040,931
CORROSION RATEMETER

Homer M. Wilson, Houston, Tex., assignor to Petrolite Corporation, St. Louis, Mo.

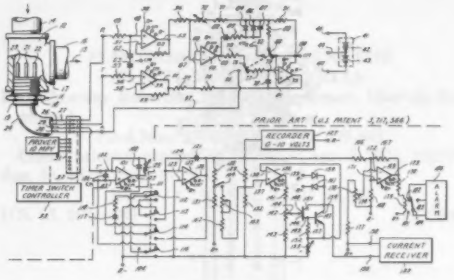
Filed Aug. 16, 1976, Ser. No. 714,559
Int. Cl.[2] G01N *27/46, 27/26*
U.S. Cl. 204—195 C 20 Claims

1. In a corrosion ratemeter having reference, test and third electrodes adapted to be placed into contact with a corrodant, a voltage loop circuit including a voltage comparator connecting said reference and test electrodes, a current loop circuit including a current source means connecting said test and third electrodes, signal correction means and reference signal means associated with said voltage and current loops for freely corroding potential correction and polarization potential addition therein and current-to-voltage converting means in said cur-

rent loop provide a voltage signal proportional to current flow in said current loop; the improvement comprising:

a. first capacitance means connected with said current-to-voltage converting means for storing a first voltage proportional in magnitude to said voltage signal;

b. storage means having a second capacitance with means with a second voltage therein; and



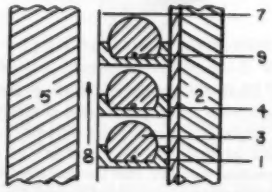
c. means for periodically connecting the first capacitance means across the storage means whereby the second capacitance means stores a resultant voltage, which resultant voltage is in proportion to the first voltage by the capacitance ratio of the first capacitance means to the sum of the first and second capacitance means, and summed with the second voltage on the second capacitance means by the capacitance ratio of the second capacitance means to the sum of the first and second capacitance means.

4,040,932

VERTICAL LIQUID ELECTRODE EMPLOYED IN ELECTROLYTIC CELLS

Donald J. Cotton, 3315 Sherman Ave. NW., Washington, D.C. 20010

Filed Oct. 28, 1975, Ser. No. 626,308
Int. Cl.[2] C25D *17/12;* **C25C** *7/00;* **C25B** *9/00*
U.S. Cl. 204—219 **21 Claims**



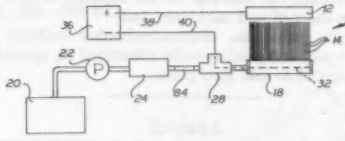
1. An electrode having a vertical component of surface created by the method of confining a liquid in a horizontal capillary trough to which said liquid is nonadhesive, so that a meniscus with a vertical component of surface of said liquid projects above the edge of said capillary trough, wherein said electrode consists of an electrode liquid which forms the active electrode surface, a suitable number of capillary troughs filled with said electrode liquid, and support for said capillary troughs to form a rigid structure having a suitable geometric shape.

4,040,933

FILTER ASSEMBLY FOR ELECTROCHEMICAL MACHINING APPARATUS

James D. Andrews, Birmingham, Mich., assignor to TRW Inc., Cleveland, Ohio

Filed Oct. 26, 1976, Ser. No. 735,620
Int. Cl.[2] C25D *17/00, 21/06;* **B01D** *23/26, 29/10*
U.S. Cl. 204—224 M **11 Claims**



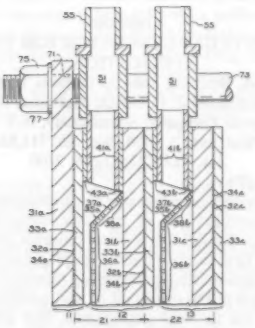
1. An apparatus for use in electrolytically removing material from a workpiece, said apparatus comprising nozzle means for directing flow of electrolyte toward the workpiece, said nozzle means at least partially defining an electrolyte flow path which decreases from a relatively large cross sectional area to a minimum cross sectional area, pump means connected in fluid communication with said nozzle means for inducing a flow of electrolyte under pressure through said nozzle means along said flow path, and filter means for removing particles from the electrolyte before it is conducted to said nozzle means, said filter means including a plurality of tubes through which electrolyte is conducted before passing through said nozzle means, each of said tubes including inner surface means defining an electrolyte flow path, at least a portion of said electrolyte flow path through each of said tubes having a cross sectional area which is less than the minimum cross sectional area of the flow path through said nozzle means to enable each of said tubes to block the passage through said filter means of particles having a cross sectional area which is greater than the minimum cross sectional area of the flow path through said nozzle means.

4,040,934

BIPOLAR ELECTROLYZER HAVING SILICON LAMINATE BACKPLATE

Howard H. Hoekje, Akron; Gordon A. Carlson, Wadsworth, and Robert B. Simmons, Norton, all of Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Nov. 14, 1975, Ser. No. 632,048
Int. Cl.[2] C25B *11/04*
U.S. Cl. 204—256 **2 Claims**



1. In a bipolar electrolyzer having a first bipolar unit and a second bipolar unit, said second bipolar unit being spaced from and parallel to said first bipolar unit and defining a single electrolytic cell therebetween, each of said bipolar units having anode means on one surface thereof and cathode means on the opposite surface thereof whereby the cathode means of

said first bipolar unit faces the anode means of the second bipolar unit, the improvement wherein at least one of said bipolar units comprises:

an electroconductive, electrolyte impermeable backplate having a steel plate as one exposed surface thereof, a silicon sheet in electrical contact with said steel plate as the opposite exposed surface of said backplate, and bonding means comprising a resilient electroconductive resinous material between said steel plate and said silicon sheet;

an electrocatalytic material on the exposed surface of the silicon sheet of said backplate; and

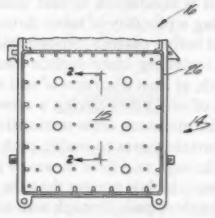
electrolyte permeable, electroconductive cathode means electrically and mechanically connected to, spaced from, and parallel to said steel plate.

4,040,935

PROTECTIVE COVERING FOR ELECTROLYTIC FILTER PRESS CELL FRAMES

Shyam D. Argade, Woodhaven; John J. Bortak, Plymouth; Stephen M. Collins, Trenton, and Eugene Y. Weissman, Birmingham, all of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Apr. 11, 1975, Ser. No. 567,293
Int. Cl.[2] C25B *1/26, 1/16, 9/00*
U.S. Cl. 204—256 **11 Claims**



1. In a bipolar electrolytic filter press cell of the type having a polypropylene cell frame interposed between adjacent electrodes, the bipolar cell having bipolar connectors for transmitting electrical energy to the cell, the improvement which comprises:

a. a protective covering mounted to the cell frame the protective covering being chemically inert to the electrolytes, the covering being configured to the configuration of the cell frame, and

b. means for mounting the covering to the cell frame.

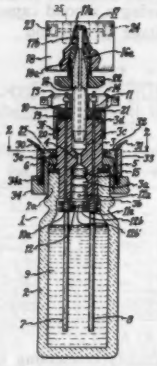
4,040,936

WET CHLORINE GAS GENERATOR FOR INSTRUMENT APPLICATIONS

Edward D. Orth, Boxford; John A. Roberts, Lynnfield, both of Mass., and Raymond J. D. Smith, Morrison, Ill., assignors to General Electric Company, Schenectady, N.Y.

Filed Aug. 2, 1976, Ser. No. 711,024
Int. Cl.[2] C25B *1/26, 9/00*
U.S. Cl. 204—271 **15 Claims**

1. A wet chlorine gas generator for instruments requiring an accurately controlled rate of gas flow, comprising an open-ended container for holding a metal chloride electrolyte solution therein, a first corrosion-resistant plug having wall means defining a gas transmitting passageway therethrough, said plug being positioned in the open end of said container to substantially close it but for said passageway, first gas-tight sealing means disposed in sealing relationship between the plug and the container to prevent gas flow therebetween, a pair of spaced electrodes mounted in fixed relationship adjacent the inner side of said plug, electrical circuit means connected to said electrodes to develop a voltage between them when connected to a source of direct current electric power, a pressure responsive gas flow regulating means mounted in fixed relationship relative to said plug and arranged to receive gas flowing from the container through the passageway in the plug, second gas-tight sealing means disposed in sealing relationship



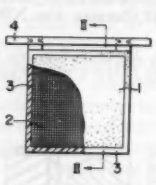
between the plug and said flow regulating means to prevent gas flowing out of the container along said circuit means, and gas conduit means connected to receive gas from said flow regulating means and guide the gas away from the container.

4,040,937

MOTHER BLANK FOR PRODUCING STARTING SHEETS USED IN ELECTROLYTIC NON-FERROUS METAL PRODUCTION

Ryozo Iijima, Osaka; Yukio Matsubara, Iwaki; Ginichi Yamaguchi, Iwaki, and Masatoshi Fukushima, Iwaki, all of Japan, assignors to Ryozo Iijima, Osaka and Onahama Seiren Kabushiki Kaisha, Tokyo, both of Japan

Filed Dec. 29, 1975, Ser. No. 645,289
Claims priority, application Japan, Dec. 28, 1974, 50-3518
Int. Cl.[2] C25B *11/00*; C25C *7/02*
U.S. Cl. 204—281 **11 Claims**



1. A mother blank for producing starting sheets used in electrolytic non-ferrous metal production comprising a laminar electrolytic deposition member and a frame-like insulating member attached integrally to the periphery of the laminar electrolytic deposition member, said laminar electrolytic deposition member comprising a plurality of electrically conductive polybutene resin layers, two of the layers forming the electrolytic deposition surfaces of the said laminar electrolytic deposition member and a planar metal member interposed between the electrically conductive polybutene resin layers; said frame-like insulating member being made of an electrically non-conductive polybutene resin, each of said electrically conductive and non-conductive polybutene resins being a crystalline polybutene resin selected from the group consisting of homopolymer of butene-1, copolymers of butene-1 and an α-olefin having carbon atoms of 2 to 4 in an amount not exceeding 20% by weight of the butene-1, and a polymer mixture of polybutene-1

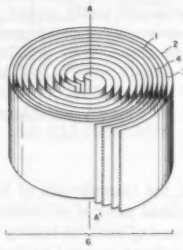
and polymer of an α-olefin having carbon atoms of from 2 to 4 in an amount not exceeding 20% by weight of the polybutene-1, and wherein said electrically conductive polybutene resin is a mixture of said crystalline polybutene resin and an electrically conductive powdery substance.

4,040,938

ELECTRODE ARRANGEMENT FOR ELECTROCHEMICAL CELLS

Peter Murday Robertson, 19 Bruttenerstrasse, Oberwil, Switzerland

Filed Mar. 18, 1975, Ser. No. 559,605
Claims priority, application Germany, Apr. 1, 1971, 2415784; Jan. 30, 1975, 2503819
Int. Cl.[2] C25B *3/02, 11/02, 13/00*
U.S. Cl. 204—283 10 Claims



1. An electrode arrangement for electrochemical cells including at least one electrode roll formed by spiralling a deformable sandwich arrangement of electrode layers and spacing layers for preventing direct electrical contact between them, at least one of the spacing layers being ion-permeable and the electrodes and spacing layers having shapes and material structures which co-operate with each other to enable electrolyte flow through the electrode roll, the electrode arrangement being characterized in that the electrode rolls are rolled up around a hollow axle and arranged by pairs, each pair having a gap between the electrode rolls and the hollow axle having orifices which enable electrolyte flow from the interior of the hollow axle into the gap of each pair of electrode rolls.

4,040,939

LEAD DIOXIDE ELECTRODE

Barry A. Schenker, Mayfield Heights, and C. Richard Franks, North Madison, both of Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Dec. 29, 1975, Ser. No. 645,014
Int. Cl.[2] C25B *11/10;* C25C *7/02*
U.S. Cl. 204—290 F 10 Claims

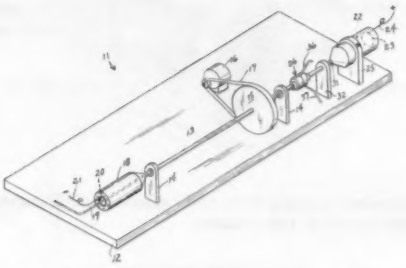
1. An electrode for use in an electrolytic process comprising: a valve metal substrate selected from the group of aluminum, molybdenum, niobium, tantalum, titanium, tungsten, zirconium, and alloys thereof; on the surface of said valve metal substrate, a semi-conductive intermediate coating consisting essentially of tin and antimony compounds applied and converted to their respective oxides such that said semi-conductive intermediate coating attains a weight greater than 2 grams per square meter of said valve metal substrate surface area; and on the surface of said semi-conductive intermediate coating, a top coating consisting essentially of lead dioxide such that said top coating attains a weight greater than 25 grams per square meter of the surface of the electrode.

4,040,940

ELECTROPHORETIC FRACTIONAL ELUTION APPARATUS EMPLOYING A ROTATIONAL SEAL FRACTION COLLECTOR

Milan Bier, Tucson, Ariz., assignor to The United States of America as represented by the Secretary of the Department of Health, Education and Welfare, Washington, D.C.

Filed Dec. 21, 1976, Ser. No. 753,103
Int. Cl.[2] G01N *27/26, 27/28*
U.S. Cl. 204—299 R 12 Claims



1. A fractional elution apparatus comprising an electrophoresis column having two longitudinally aligned abutting parts with registering lumens, means to rotate the parts axially relative to each other, and means defining a rotating seal fraction collector for the elution of fractions separated electrophoretically within the lumens, said collector comprising two mated flat surfaces perpendicular to the axis of the column at the abutting ends of said parts, one of said flat surfaces rotating and the other flat surface being stationary, and means for directing at least one narrow jet of eluting buffer perpendicular to the axis of rotation substantially at the interface formed by said mated surfaces.

4,040,941

PROCESS FOR LIQUEFYING COAL

Yasuhiro Yamada; Hidemasa Honda, and Hitoo Kakiyama, all of Tosu, Japan, assignors to Director-General of the Agency of Industrial Science and Technology, Tokyo, Japan

Filed Nov. 17, 1975, Ser. No. 632,656
Int. Cl.[2] C10G *1/04*
U.S. Cl. 208—8 7 Claims

1. A process for liquefying coal, characterized by mixing a pitch obtained by heating asphalt at a temperature of 350°–450° C for a time of about 0.5-3 hours and until an atomic ratio C/H of said asphalt becomes at least 0.9 with a sufficient amount of powdery coal to give a mixing ratio by weight of 2:1 to 1:10 of pitch to said powdery coal, and then heating the mixture for 0.5–10 hours at 320°–400° C to substantially dissolve said coal in said pitch and form a substantially homogeneous mixture substantially free of undissolved coal particles.

4,040,942

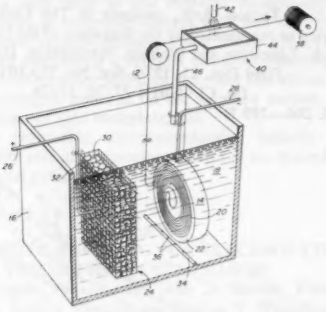
MULTIPLE-TRACK CATHODE FOR ELECTROFORMATION OF METALLIC FILAMENTS

David W. Marshall, North Reading; Kenneth W. MCGrath, Attleboro, both of Mass.; William R. O'Day, Jr., Brookfield, Wis., and Thomas C. Wilder, Cambridge, Mass., assignors to Kennecott Copper Corporation, New York, N.Y.

Filed Aug. 23, 1976, Ser. No. 716,839
Int. Cl.[2] C25D *1/04, 1/20*
U.S. Cl. 204—13 10 Claims

1. In a cathode for total immersion in a plating solution for the continuous electroformation of metallic filaments, comprising an electrically conductive closed-loop plating pattern on a planar surface of said cathode, the improvement wherein said pattern comprising of substantially congruent adjacent narrow plating surfaces, and insulating regions intermediate said plat-

ing surfaces; whereby a plurality of filaments are simultaneously electroformed on said cathode in patterns that enable



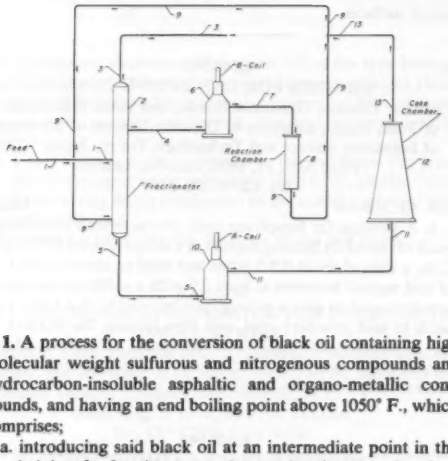
simultaneous stripping from said cathode of all filaments deposited on said plating surfaces.

4,040,943

COMBINATION THERMAL CRACKING AND COKING PROCESS

Frank Stolfa, Park Ridge, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed June 30, 1976, Ser. No. 701,327
Int. Cl.[2] C10B *55/00*; C10G *9/14, 37/02*
U.S. Cl. 208—80 **3 Claims**



1. A process for the conversion of black oil containing high molecular weight sulfurous and nitrogenous compounds and hydrocarbon-insoluble asphaltic and organo-metallic compounds, and having an end boiling point above 1050° F., which comprises;

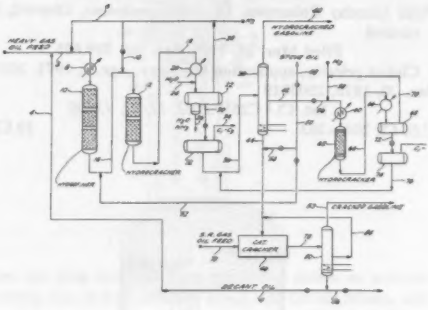
a. introducing said black oil at an intermediate point in the height of a fractionator and removing from the fractionator an overhead gasoline stream, an intermediate heavy distillate stream and a bottoms stream;
b. passing said heavy distillate stream through a first thermal cracking coil and a reaction chamber and therein cracking the same;
c. passing said bottoms stream through a second thermal cracking coil and thence into a coke chamber and separating vapors from coke in said chamber;
d. commingling the vapors from the coke chamber with the effluent from said reaction chamber; and
e. introducing the resultant mixture to the lower portion of said fractionator at a point below the point of introduction of said black oil thereto.

4,040,944

MANUFACTURE OF CATALYTIC CRACKING CHARGE STOCKS BY HYDROCRACKING

Arnold E. Kelley, Orange; Cloyd P. Reeg, Fullerton; Frederick C. Wood, Fullerton, and George D. Cheadle, Fullerton, all of Calif., assignors to Union Oil Company of California, Los Angeles, Calif.

Continuation-in-part of Ser. No. 720,508, April 11, 1968, Pat. No. 3,728,251. This application Feb. 22, 1973, Ser. No. 334,765
Int. Cl.[2] C10G *23/00*
U.S. Cl. 208—89 **7 Claims**



1. A process for the manufacture of high-octane gasoline products from an initial mineral oil feedstock containing less than 20 weight-percent of material boiling below 600° F and at least 20 weight-percent of material boiling above 800° F, and also containing condensed polyaromatic compounds, sulfur compounds and nitrogen compounds, which comprises:

1. subjecting said initial feedstock plus added hydrogen to catalytic hydrofining at elevated temperatures and pressures above about 1000 psig, in the presence of a hydrofining catalyst under hydrofining conditions correlated to give a substantial desulfurization and denitrogenation of said feedstock while synthesizing less than about 10 volume-percent of C_6–400° F. gasoline;
2. subjecting total effluent from step (1) to catalytic hydrocracking at temperatures between about 650° and 875° F. and pressures above about 1000 psig in the presence of a crystalline zeolite hydrocracking catalyst, and correlating the hydrocracking conditions so as to limit the synthesis of C_6–400° F. gasoline to between about 5 percent and 30 percent by volume and produce a hydrocracked product containing a higher weight ratio of material boiling above 800° F to material boiling between 600° and 800° F than was contained in the effluent from step (1), said zeolite hydrocracking catalyst consisting essentially of a Group VIB and/or Group VIII metal hydrogenating component supported on an aluminosilicate zeolite cracking base having relatively uniform crystal pore diameters between about 4 and 14 A and wherein the zeolite cations are mainly hydrogen ions and/or polyvalent metal ions;
3. recovering from the hydrocracked effluent a hydrocracked gasoline product and a catalytic cracking charge stock boiling above 400° F. and containing a substantial proportion of material boiling above 800° F., including the highest boiling fraction of said hydrocracked effluent;
4. subjecting said catalytic cracking charge stock to catalytic cracking at temperatures of about 850° – 1150° F. and pressures below about 1000 psig, and recovering therefrom a cracked gasoline product, an intermediate boiling range cycle oil, and a heavy bottoms fraction boiling mainly above 800° F.; and
5. withdrawing from the process at least a portion of said heavy bottoms fraction.

4,040,945

HYDROCARBON CATALYTIC CRACKING PROCESS

Joel D. McKinney, Pittsburgh, and Bruce R. Mitchell, Sarver, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Jan. 2, 1976, Ser. No. 646,020
Int. Cl.[2] C10G *11/04;* B01J *8/24*
U.S. Cl. 208—113 7 Claims

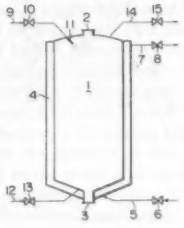
1. In a process which comprises contacting a hydrocarbon feed with a cracking catalyst containing at least 1500 ppm nickel equivalents as metal contaminants in a cracking zone under cracking conditions and thereafter heating the deactivated catalyst in the presence of oxygen in a regeneration zone; the improvement which comprises introducing tin into said cracking zone so as to maintain a volume ratio of carbon dioxide to carbon monoxide of at least 3.0 in the gaseous effluent withdrawn from said regeneration zone.

4,040,946

PROCESS FOR THE PRODUCTION OF A PETROLEUM COKE AND COKING CRYSTALLIZER USED THEREOF

Kiyoshige Hayashi, Tokyo; Mikio Nakaniwa, Ohme; Nobuyuki Kobayashi, Ichihara; Minoru Yamamoto, Ichihara, and Yoshihiko Hase, Ichihara, all of Japan, assignors to Maruzen Petrochemical Co., Ltd., Tokyo, Japan

Filed Sept. 18, 1975, Ser. No. 614,675
Claims priority, application Japan, Sept. 26, 1974, 49-109966
Int. Cl.[2] C10G *9/14*
U.S. Cl. 208—131 11 Claims



1. A process for the production of a petroleum coke of unusually high-crystalline texture and of a high purity from a petroleum starting material having a low sulfur content and suitable for the production of premium grade coke which comprises the steps of:

subjecting the starting material to heat treatment to remove non-crystalline substances contained therein as pitch or coke and to form a heavy oil fraction of the starting material;

heating a heavy oil fraction of the starting material derived from the preceding stage to a temperature required for the subsequent coking;

continuously introducing the preheated oil with downward injection into a vertical, pressure coking-crystallizer, which is provided with a heating jacket surrounding the body thereof, a first injection nozzle at the upper part thereof for downwardly injecting the preheated oil and a second injection nozzle at the lower part thereof for upwardly injecting a purging gas;

maintaining said crystallizer at a coking temperature whereby gaseous light hydrocarbons are formed either by evaporation or by reactions of the oil introduced and whereby the remaining pitch-like heavy oil flows downwardly and is progressively accumulated and coked;

discharging, during coking, gaseous light hydrocarbons through an outlet positioned at the upper part of the crystallizer

introducing, during coking, a small amount of a heated purging gas through said second injection nozzle into said crystallizer at a slow rate capable of preventing the clogging of the gas injection nozzle, thereby conducting the coking with a high growth and high orientation of coke crystals formed until the coke accumulated in the crystallizer reaches near said first injection nozzle;

terminating the introduction of preheated oil into the crystallizer;

increasing the amount of the purging gas flow to expel remaining oily materials; and

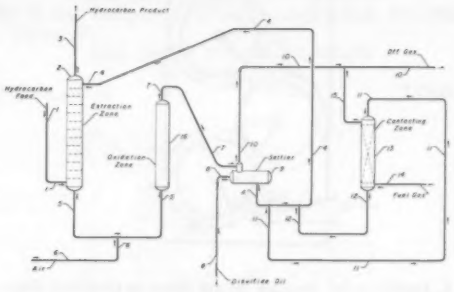
removing the coke from the crystallizer.

4,040,947

MERCAPTAN EXTRACTION PROCESS UTILIZING A STRIPPED ALKALINE SOLUTION

William J. Christman, Barrington, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Apr. 8, 1976, Ser. No. 675,081
Int. Cl.[2] C10G *19/02, 21/28*
U.S. Cl. 208—235 5 Claims



1. A continuous process for the removal of mercaptans from a feed stream comprising at least 2000 wt. ppm. mercaptans and a mixture of hydrocarbons having boiling points below about 650° F., which comprises the steps of:

a. contacting the feed stream with an alkaline solution comprising water and an alkaline reagent in an extraction zone maintained at extraction conditions effective to promote the transfer of essentially all of the mercaptans from the feed stream to the alkaline solution and the formation of a treated product stream, which is removed from the extraction zone, and a mercaptan-containing alkaline solution;

b. contacting the mercaptan-containing alkaline solution with oxygen with an oxidation catalyst in an oxidation zone at conditions effective to form an oxidation zone effluent stream comprising disulfide compounds, in said alkaline solution;

c. passing the oxidation zone effluent stream into a phase separation zone operated at conditions selected to produce a first liquid phase comprising said alkaline solution, a second liquid phase comprising said disulfide compounds and an off-gas stream comprising oxygen;

d. withdrawing the second liquid phase from the phase separation zone of step (c);

e. recycling a first portion of said first liquid phase from step (c) to the extraction zone of step (a);

f. removing said off-gas stream from said process in admixture with a first vapor stream as hereinafter delineated;

g. countercurrently contacting a second portion of said first liquid phase with a second vapor stream comprising hydrocarbons having less than five carbon atoms at conditions effective to strip water from said second portion of said first liquid phase and to form said first vapor stream; and,

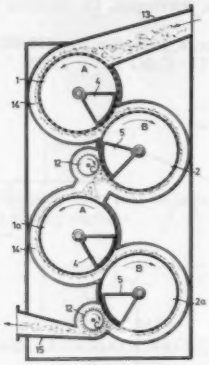
h. admixing the stripped second portion of said first liquid phase from step (g) with said first portion of said first liquid phase of step (e) being recycled to the extraction zone to form said alkaline solution of step (a), whereby water formed in the oxidation zone is removed from the process and the concentration of alkaline reagent in the alkaline solution is controlled.

4,040,948

DEVICE FOR CLEANING FLOCK FORMED BY NATURAL FIBERS, ESPECIALLY COTTON FLOCK, OF DIRT PARTICLES

Herbert Hergeth, and Walter Wirth, both of Dulmen, Germany, assignors to Hergeth KG Maschinenfabrik und Apparatebau, Germany

Filed June 11, 1975, Ser. No. 585,859
Claims priority, application Germany, June 27, 1974, 2431018
Int. Cl.[2] B07B 9/00
U.S. Cl. 209—22 2 Claims



1. Apparatus for cleaning natural fibers by removing therefrom particles of dirt, fiber dust, broken fiber particles and like contaminants comprising a pair of rotary drum sieves each having a porous peripheral surface, means for rotating said drum sieves in opposite directions, means for feeding natural fibers to a first of said drum sieves, means for drawing a vacuum within each drum sieve whereby natural fibers adhere to said porous peripheral surfaces and contaminants are drawn through said porous peripheral surfaces, said drum sieves being disposed with portions of their peripheral surfaces defining a throat through which the fibers pass, means only at and contiguous said throat for cutting off the vacuum effect of said first drum sieve porous peripheral surface at said throat whereby the fibers are transferred from said first drum sieve to the second drum sieve whereby due to the opposite rotation of said drum sieves contaminants are withdrawn from opposite sides of said fibers as they pass along said pair of drum sieves, means for removing fibers from the porous peripheral surface of said second drum sieve, said fiber removing means being a roller rotating in a direction opposite to that of said second drum sieve, and the porosity of the porous peripheral surface of an upstream one of said drum sieves is greater than the porosity of the porous peripheral surface of a downstream one of said drum sieves.

4,040,949

METHOD FOR SEPARATION OF MIXTURE OF POLYESTER AND CELLULOSE DERIVATIVE

Kozo Saitoh, Tokyo, and Sumio Izumi, Kokubunji, both of Japan, assignors to Mitsui Mining & Smelting Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 469,723, May 14, 1974, Pat. No. 3,941,688. This application Sept. 10, 1975, Ser. No. 612,150
Claims priority, application Japan, Dec. 8, 1973, 48-138254; Dec. 8, 1973, 48-138255
Int. Cl.[2] B03D 1/02
U.S. Cl. 209—166 3 Claims

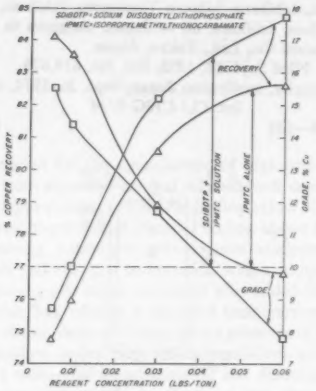
1. A method for the separation of a mixture of a polyester and a cellulose plastic derivative selected from the group consisting of cellulose diacetate, cellulose triacetate and nitrocellulose consisting of introducing gas bubbles into a dispersion of a mixture of said polyester and said cellulose derivative, said polyester and said cellulose derivative being solid pieces having a size of 1 to 50 mm, in an aqueous liquid medium, thereby floating said polyester from separating said polyester and said cellulose derivative.

4,040,950

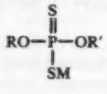
CONCENTRATION OF ORE BY FLOTATION WITH SOLUTIONS OF AQUEOUS DITHIOPHOSPHATES AND THIONOCARBAMATE AS COLLECTOR

Donald Edwin Zipperian; James Allen Jones, and Thomas Brian Buza, all of Tuscon, Ariz., assignors to American Cyanamid Company, Stamford, Conn.

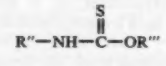
Division of Ser. No. 493,946, Aug. 1, 1974, Pat. No. 3,925,218. This application June 6, 1975, Ser. No. 584,685
Int. Cl.[2] B03D 1/02
U.S. Cl. 209—166 5 Claims



1. In the process of recovering copper sulfide values from a copper-bearing ore by froth flotation employing a collector for said copper sulfide values, the improvement which comprises employing as said collector an aqueous solution comprising from about 35 to 50 weight percent of an alkali metal or ammonium salt of a dialkyl dithiophosphate of the formula



wherein M is an alkali metal or ammonium ion and R and R' are individually selected from alkyl groups of 2 to 8 carbon atoms and, correspondingly, from about 65 to 50 weight percent of water, said solution containing dissolved therein an N-alkyl O-alkyl thionocarbamate of the structure

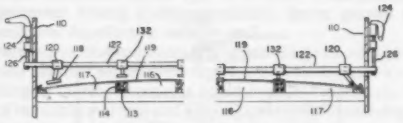


wherein R" and R"' are individually selected from alkyl groups of about 1 to 6 carbon atoms, said thionocarbamate being present in an amount sufficient to provide a weight ratio in the range of from about 30:70 to 95:5 of said dialkyldithiophosphate solution to said thionocarbamate, respectively, said collector being present in an amount of from about 0.001 to about 0.1 pounds per ton or ore.

4,040,951
APPARATUS FOR RETAINING AND READILY RELEASING A SHAKER SCREEN

Kenneth Raymond Cole, R.D. 1 Smith Road, Sussex, N.J. 07461

Filed Dec. 16, 1975, Ser. No. 641,310
Int. Cl.[2] B07B 1/42
U.S. Cl. 209—408 8 Claims

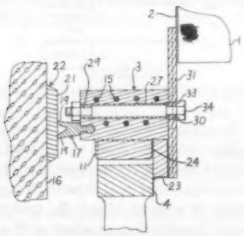


1. Apparatus for retaining and ready release of the screen in a shaker frame, said apparatus including: (a) a shaker frame of conventional construction and having side and end members; (b) a screen of conventional construction and having apertures of determined and selected size; (c) a screen supporting grid carried by said frame and having a supporting surface contoured and conditioned to suit the screen to be supported during the shaking operation; (d) a plurality of toggle mechanisms carried on each of the side members, the toggle mechanisms arranged so that the toggle actuated member portion is moved selectively to an upper and a lower position at which limits of movement the mechanisms remain until manipulated to be moved to the other limit; (e) a transverse rod carried below the support grid at each end by one of the toggle mechanism actuated members, a toggle mechanism being arranged on each side member of the frame, and (f) a plurality of pressure pad portions carried by the transverse rods and including a plurality of T-nuts which is slidable along the rod and while mounted on the rod the head of the nut prevents the turning of the nut and there is mounted in each T-nut a T-bolt whose head is larger than the aperture in the screen and whose shank is sized to pass through the aperture in the screen, each pad portion when moved to the down position by the rod as it is moved by the toggle mechanism engaging the upper surface of the screen to urge the screen into retained condition on the supporting grid and when the toggle mechanism is moved to the upper position the pressure pads are carried upwardly by the transverse rods and from engagement with the screen which is now free for removal and replacement in the frame and on the support grid.

4,040,952
TRAVELING BAND SCREEN

Wolfgang Jopp, Niederneisen, Germany, assignor to Passavant-Werke Michelbacher Hutte, Aarbergen, Germany

Filed Dec. 4, 1975, Ser. No. 637,748
Claims priority, application Germany, Feb. 26, 1975, 2508352
Int. Cl.[2] B01D 33/04
U.S. Cl. 210—400 7 Claims



1. In a screening unit embodying an endless traveling band screen formed of a plurality of screening elements,

a. an endless, impermeable, flexible belt extending alongside each side of said traveling band screen adjacent the ends of said screening elements,

b. upper and lower rotary members around which the endless belts pass,

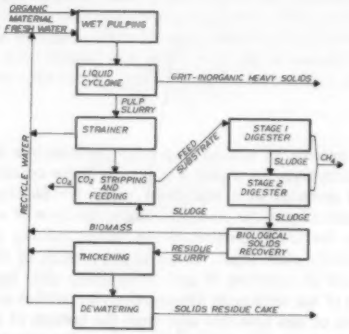
c. means operatively connecting each end of each said screening element to the belt adjacent thereto, and

d. a laterally projecting endless sealing member carried by each said belt in position to sealingly engage an adjacent wall of the screen unit.

4,040,953
ANAEROBIC DIGESTION PROCESS

Jay E. Ort, Lewistown, Pa., assignor to RecTech, Inc., State College, Pa.

Filed Mar. 10, 1976, Ser. No. 665,606
Int. Cl.[2] C02C 1/14
U.S. Cl. 210—6 7 Claims



1. A process for treating a liquid slurry of organic material to produce a gaseous product comprising a major amount of methane gas and a minor amount of carbon dioxide gas, said process involving anaerobic digestion in a stage 1 digestor and a stage 2 digestor and maintaining said liquid slurry in a well mixed condition under temperature conditions effective in producing said gaseous product, said liquid slurry being maintained in each digester with an air space above defining an interface with said liquid slurry being maintained at a volume-to-interface ratio of at least 100 gal. per ft.[2], and a total combined digestor liquid retention time of at least 24 hours whereby the faster molecular diffusion rate of methane gas as compared with carbon dioxide gas enables the passage through said interface of substantial amounts of the methane gas evolving from said slurry while minimizing the passage of carbon dioxide gas through said interface to achieve a gaseous product having a major amount of methane gas and a minor amount of carbon dioxide gas and a spent sludge containing said carbon dioxide, said anaerobic digestion taking place initially by introducing said liquid slurry into a stage 1 digester for a first holding time effective in producing said gaseous product, removing said gaseous product from said stage 1 digester, with the resulting sludge from the stage 1 digester being transferred to a stage 2 digester wherein said anaerobic digestion continues for a second holding time effective in producing said gaseous product, removing said gaseous product from the stage 2 digestor and transferring the spent sludge from the stage 2 digester to a stripping zone wherein the pH of the sludge is adjusted to from 6.0 to 6.5 by the addition of acid, stripping said carbon dioxide from said spend sludge, and recycling said spend sludge from said stripping zone to said stage 1 digester.

4,040,954

CONTROL OF FLOCCULANT ADDITION IN SEDIMENTATION APPARATUS

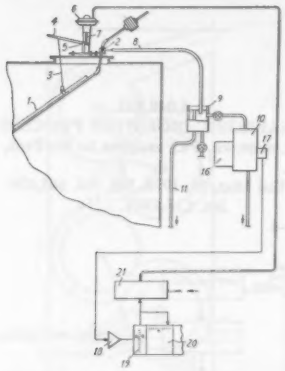
John Leslie Chandler, Mandeville, Jamaica, assignor to Alcan Research and Development Limited, Montreal, Canada

Filed Jan. 22, 1976, Ser. No. 651,565

Claims priority, application United Kingdom, Jan. 24, 1975, 3310/75

Int. Cl.[2] C02B *1/20;* B01D *21/01*

U.S. Cl. 210—42 R 7 Claims



1. A process for settling suspended particles in a liquid medium comprising supplying a stream of liquor containing suspended particles to a settlement vessel for clarification by settlement of particles concentrating in the form of a flowable mud in the lower portion of the vessel thereby providing substantially clear liquor in the upper portion of the vessel, taking off an overflow of said substantially clear liquor from the top of the settlement vessel, removing settled particles in the form of said flowable mud from the bottom of the settlement vessel, supplying flocculating agent for admixture with the liquor entering said settlement vessel and controlling the relative proportions of flocculating agent and supplied liquor for maintaining a substantial layer of cloudy liquor lying between said flowable mud and a supernatent clear liquor layer in said settlement vessel.

4,040,955

METHOD OF TREATING WASTEWATER CONTAINING EMULSIFIED OILS

Dennis D. Davidson, Detroit, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Filed Aug. 14, 1975, Ser. No. 604,698

Int. Cl.[2] B01D *21/01;* C02B *1/20*

U.S. Cl. 210—44 14 Claims

1. In the method of treating industrial wastewater for the removal of oil dispersed therein in which a floc forming constituent is added to the water and upon formation of floc a substantial amount of oil is adsorbed from the water, the improvement comprising: separating most of the wastewater from the floc after adsorption has occurred and retaining a minor amount of the wastewater with the floc, dissolving a substantial amount of the floc in the retained wastewater whereby the retained wastewater becomes enriched in the dissolved floc forming constituent and the remaining floc becomes enriched in adsorbed oil, separating the remaining floc from the enriched retained wastewater, and adding untreated wastewater to the enriched retained wastewater whereby floc reforms and adsorbs oil from the wastewater.

4,040,956

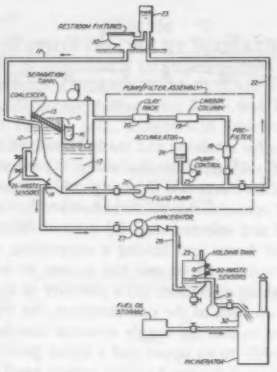
SYNTHETIC FLUSH FLUIDS

Charles M. Selwitz, Monroeville, Pa., assignor to Gulf Research & Development Company, Pittsburgh, Pa.

Filed June 7, 1976, Ser. No. 693,199

Int. Cl.[2] E03D *5/016*

U.S. Cl. 210—60 5 Claims



1. In a process for disposing of sewage in which a synthetic flush fluid receives the sewage, carries the sewage to apparatus for disposition thereof and is recirculated to receive additional sewage, the improvement which comprises a cyclohexylalkane synthetic flush fluid wherein the alkane carbon chain is selected from straight or branched chain alkyl moieties having from 12 to 14 carbon atoms; and wherein said cyclohexylalkane is selected from the group of cyclohexyldodecane; cyclohexltridecane; cyclohexyltetradecane; cyclohexyl-methyldodecane; cyclohexyl-methyl-tridecane; and mixtures thereof, said flush fluid having a viscosity of up to about 10 centistokes at 100° F, a pour point of about 0° F or lower, an aniline point of at least about 170° F, a flash point of at least about 325° F, and a density of from about 0.75 to about 0.90 at 60° F.

4,040,957

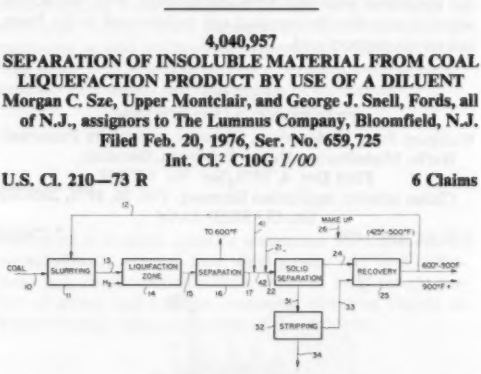
SEPARATION OF INSOLUBLE MATERIAL FROM COAL LIQUEFACTION PRODUCT BY USE OF A DILUENT

Morgan C. Sze, Upper Montclair, and George J. Snell, Fords, all of N.J., assignors to The Lummus Company, Bloomfield, N.J.

Filed Feb. 20, 1976, Ser. No. 659,725

Int. Cl.[2] C10G *1/00*

U.S. Cl. 210—73 R 6 Claims



1. A process for separating insoluble material from a coal liquefaction product produced from a coal feed and comprised of insoluble material and carbonaceous matter dissolved in a coal liquefaction solvent, said coal liquefaction product having quinoline insolubles of at least 15 wt. %, comprising:

diluting said coal liquefaction product with a liquid diluent, said liquid diluent being a solvent for the quinoline soluble and benzene insoluble components in said coal liquefaction product and a nonsolvent for quinoline insoluble components and being added in an amount to provide a

mixture of coal liquefaction product and diluent having quinoline insolubles of no greater than 13 wt.%;

mixing the diluted coal liquefaction product with a liquid promoter, said liquid promoter being different from said diluent and having a 5 volume percent distillation temperature of at least about 250° F and a 95 volume percent distillation temperature of at least about 350° F and no greater than about 750° F, said promoter liquid having a characterization factor (K) of at least 9.75, said liquid promoter having a characterization factor greater than said coal liquefaction solvent; and

separating insoluble material from said diluted coal liquefaction product mixed with liquid promoter by gravity settling to thereby recover a liquid overflow essentially free of insoluble material and a liquid underflow containing the insoluble material.

4,040,958

PROCESS FOR SEPARATING SOLIDS FROM HIGH-BOILING HYDROCARBONS IN A PLURALITY OF SEPARATION STAGES

Roland Rammler, Konigstein, Germany, assignor to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Filed Jan. 26, 1976, Ser. No. 652,589

Claims priority, application Germany, Feb. 4, 1975, 2504488

Int. Cl.[2] B01D *21/00, 21/26*

U.S. Cl. 210—73 R **8 Claims**

1. Process of separating solids from solids-containing, high-boiling hydrocarbons in two or more separation stages, each separation stage comprising a mixing zone and downstream from said mixing zone a separation zone, said process comprising (a) withdrawing from each separation zone a low-solids liquid phase and a solids-enriched phase and feeding said solids-enriched phase from each separation zone to the mixing zone of the following stage; (a) feeding said solids-containing, high-boiling hydrocarbons together with a low-boiling liquid hydrocarbon diluent and the low-solids liquid phase withdrawn from the separation zone of the second separation stage to the mixing zone of the first separation stage, said diluent containing at least one component selected from the group consisting of medium oil, light oil or gasoline, (c) feeding the low-solids liquid phase from said first separation stage to a distillation zone and recovering said low-boiling diluent therefrom, (d) feeding the low-solids liquid phase of each stage following said first stage to the mixing zone of the preceding stage and (e) recovering solids-free, high-boiling hydrocarbons from said distillation zone.

4,040,959

MULTI-PURPOSE BLOOD BAG

Irwin R. Berman, 1155 Park Ave., New York, N.Y. 10028, and Ira M. Nathan, Old Forge Drive, Carmel, N.Y. 10512

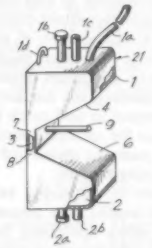
Filed June 22, 1976, Ser. No. 698,569

Int. Cl.[2] B01D *33/02;* **B04B** *3/00*

U.S. Cl. 210—78 **21 Claims**

1. A blood bag in combination with a rigid support means, said blood bag of flexible, at least translucent plastic for separation of whole blood into fractions and for direct transfusion therefrom, said bag comprising an upper chamber, a lower chamber, a sealable neck of reduced cross section connecting said upper and lower chambers, said upper and lower chambers and neck cooperating to define a gap when said blood bag is filled with blood, said rigid support means having a shape which generally conforms to the contour of said gap, said support means when positioned in said gap functioning to prevent collapse of said upper chamber toward said lower chamber during centrifugation, means for introducing blood into said blood bag and means for removing fractions of said blood subsequent to separating same, whether by gravity or by centrifugation, said upper and lower chambers and said neck being so sized that when separation of blood of normal range hematocrit into packed red blood cells, buffy coat and plasma is carried out in said bag, the interfaces between said packed red blood cells and said buffy coat and between said buffy coat and said plasma will lie in said neck, said plastic being of a flexibility such that application of pressure to either one of said chambers will move said interfaces toward the other chamber, thereby providing for positioning both of said interfaces within said sealable neck prior to sealing same.

11. A method of separating whole blood into recoverable fractions, comprising the steps of filling with blood a flexible, at least translucent bag having upper and lower chambers connected by a neck with a gap between said chambers, positioning rigid support means in said gap between said chambers, said upper and lower chambers being sized so that on settling, buffy coat will lie within said neck with blood of normal hematocrit, centrifuging said bag with support means causing packed red cells to separate from said blood, exerting pressure



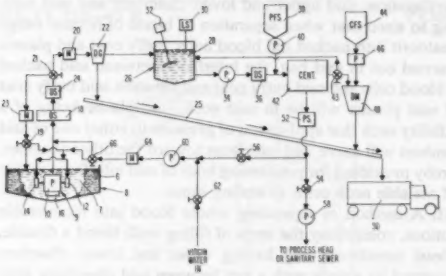
on one of said chambers where necessary to bring the upper surface of said packed red blood cells into said neck and near the bottom thereof, and sealing said neck immediately below said upper surface, thereby making it possible to recover virtually 100% of said packed red blood cells from the blood in said bag.

21. A blood bag of flexible, at least translucent plastic for separation of whole blood into fractions and for direct transfusion therefrom, said bag comprising an upper chamber, a lower chamber, a sealable first neck of reduced cross section connecting said upper and lower chambers, a second neck connecting said chambers, means for introducing blood into said blood bag and means for removing fractions of said blood subsequent to separating same, whether by gravity or by centrifugation, said upper and lower chambers and said first neck being so sized that when separation of blood of normal range hematocrit into packed red blood cells, buffy coat and plasma is carried out in said bag, the interfaces between said buffy coat and said plasma will lie in said first neck, said second neck initially having seals at the top and bottom thereof, and containing therein, means to open said seals, said second neck functioning upon the opening of said seals to mix plasma with red blood cells within said bag after separating same, said plastic being of a flexibility such that application of pressure to either one of said chambers will move said interfaces toward the other chamber, thereby providing for positioning both of said interfaces within said sealable first neck prior to sealing same.

4,040,960
CATCH BASIN PROCESSING APPARATUS

Lauren P. Taylor, Swarthmore, and Alex Petroski, Springfield, both of Pa., assignors to LRS Research Limited, Broomall, Pa.

Filed July 26, 1976, Ser. No. 709,566
Int. Cl.[2] B01D *21/00*
U.S. Cl. 210—96 R 25 Claims

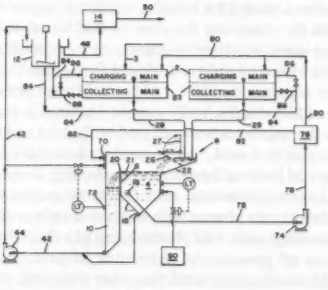


1. A catch basin cleaning system for removing liquid, solid and semi-solid wastes from catch basins comprising:
   a. pumping means including means for injecting liquid under pressure into said catch basin to combine with and suspend wastes therein, and means for removing waste containing liquids therefrom said pumping means further comprising shunt means for selectively returning waste containing liquids directly to said catch basin, said shunt means further comprising shunt density sensor means for determining the solids content of the waste containing liquid removed from said catch basin, and shunt control means responsive to said shunt density sensor means for continuously controlling the amount of said waste containing liquid returned to said catch basin;
   b. equalization means for receiving waste containing liquids from at least said pumping means and temporarily holding said waste containing liquids;
   c. dewatering means for receiving said waste containing liquids from said equilization means and for removing liquid from said waste containing liquids to produce at least a liquid and a thickened portion;
   d. water supply means for supplying liquid at least to said pumping means and for receiving said liquid portion from said dewatering means.

4,040,961
SEPARATION OF SOLIDS FROM A LIQUID

Rufus F. Davis, Jr., Kenwood, Ky., and Donald G. Marting, Murray Hill, N.J., assignors to Coaltek Associates, Morristown, N.J.

Filed June 26, 1975, Ser. No. 590,751
Int. Cl.[2] B01D *21/10*
U.S. Cl. 210—195 R 8 Claims

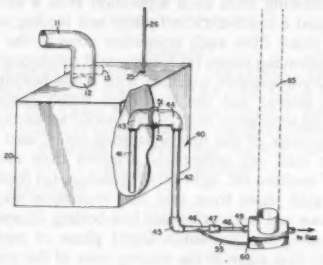


1. An apparatus for separating solid particles suspended in a liquid, said solid particles including a light particle portion which tends to float at or close to the surface of the liquid and a heavy particle portion which tends to sink to the bottom of the liquid, said separation apparatus comprising:
   a separation tank for receiving said liquid and said suspended solid particles;
   inlet means for conducting said liquid into said separator tank;
   conduit means for conducting said liquid containing solid particles into said inlet means, said conduit means having an output end connected to said inlet means, said output end of said conduit means having a substantially U-shape with two upstanding legs, each of said legs of said U-shape arranged in a substantially vertical plane, one of said legs connected to said inlet means and extending into said inlet means;
   screening means arranged in the bottom of said inlet means through which said liquid containing said solid particles flow from said inlet means into said separation tank;
   a weir disposed in said separation tank, said weir having an upper edge, said upper edge arranged at an elevation in said separation tank which is slightly lower than a normal level of the liquid in said separation tank to permit said light particles to flow over said weir and out of said separation tank;
   outlet means disposed at the bottom of said separation tank to permit the heavy particles in said liquid which sink toward the bottom of the liquid in said separation tank to flow out of said separation tank; and
   outlet means disposed at an intermediate elevation in said separation tank for conducting substantially clear liquid out of said separation tank.

4,040,962
APPARATUS FOR FEEDING CHEMICALS TO A LIQUID STREAM

William E. Hanford, 4956 Sentinel Drive, Sumner Village, Bethesda, Md. 20016

Filed Feb. 27, 1976, Ser. No. 662,209
Int. Cl.[2] C02B *3/06*; C02C *1/40*
U.S. Cl. 210—206 9 Claims



1. Apparatus for feeding, without use of a pump, substantially uniform amounts of a chemical into a liquid stream having an irregular flow pattern, comprising:
   a holding tank having an inlet port for receiving said liquid stream, said tank having an aperture located at a relatively high position in a side wall thereof;
   siphon means comprising a section of pipe passing through said aperture with an inner leg which extends to a position near the bottom of said tank and an outer leg which extends to a position substantially below the bottom of said tank;
   chemical feeding means coupled to the outer pipe leg of said siphon means, said feeding means containing a supply of said chemical and being operative to feed said chemical into the liquid discharged from said outer leg at a rate

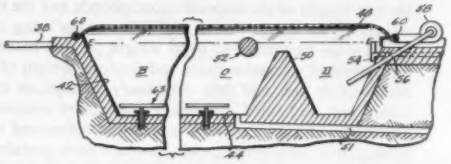
which has dependence upon the liquid discharge rate; whereby liquid will accumulate in said holding tank without discharge until the level in said tank reaches the aperture whereupon discharge will occur at a substantially uniform rate to empty the tank to a level corresponding to about the bottom of the inner leg, the uniform discharge into said chemical feeding means providing a uniform chemical feed rate without the need for a pump.

4,040,963

ANAEROBIC WASTE TREATMENT FACILITY

Warren A. Garrott, Jr., Box 4612, 1816 Douglass Drive, Jackson, Miss. 39216

Filed May 19, 1975, Ser. No. 578,861
Int. Cl.[2] C02C *1/14*
U.S. Cl. 210—219 **4 Claims**



1. An anaerobic waste treatment facility comprising

a. a digestor having a bottom, side walls, an open top, said open top being defined by a peripheral top surface, and a cover for said open top said digestor adapted to hold a quantity of liquid containing organic matter to be digested therein, said liquid assuming a liquid level in said digestor, said digestor having an inlet, a mixing zone, a quiescent zone, a clear zone, and an outlet, said inlet providing entry of liquid into said mixing zone, and said outlet for removing liquid from said clear zone,

b. means for preventing the entry of large particles from said quiescent zone into said clear zone, and

c. means for selectively circulating liquid from said clear zone to said mixing zone and agitating the liquid in said mixing zone as liquid in introduced into said mixing zone from said clear zone, said means comprising a rotor member disposed below the liquid level of said digestor, and means formed in said rotor member for transferring the force of liquid circulating through said rotor into rotary movement of said rotor and rotary circulation of liquid from said rotor into liquid in said mixing zone, said rotor member comprising a first conduit member stationary with respect to said digestor, and a second conduit member movable generally vertically with respect to and rotatable with respect to said first member about a generally vertical axis of rotation, said second member moving vertically upwardly and rotating with respect to said first member upon the introduction of liquid under pressure into said first member, and means for limiting the vertical movement of said second member with respect to said first member so that said second member is always disposed below the level of liquid in said digestor.

4,040,964

ADJUSTABLE CONTAINER STRAINER AND HANDLE

Eugenia Hegyi, 2477 W. Lincoln, Apt. 49, Anaheim, Calif. 92801

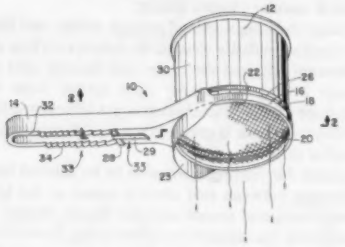
Filed June 22, 1976, Ser. No. 698,526
Int. Cl.[2] B01D *35/28*
U.S. Cl. 210—238 **4 Claims**

1. An adjustable container strainer and handle comprising:

a. a handle element;

b. a trainer element affixed to said handle element; and

c. securing means for adjustably securing said strainer element over the mouth of a container permitting the straining of contents therein by the tilting thereof; said securing means comprises a flexible band element adapted to circumscribe the outer walls of a container and being affixed on one end to said handle element and on the other end to an arm having a tongue member slidably disposed within an elongated cavity within said handle element providing the tensioning of said flexible band element by the movement of said arm away from said container; and



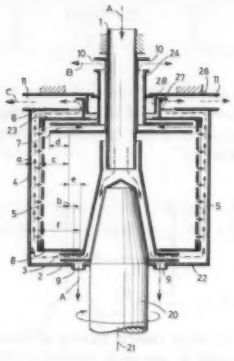
d. locking means for locking the arm in position within the handle element thereby locking said container strainer and handle over the mouth of said container; the locking means comprising a multiplicity of protrusions affixed to said handle adapted to engage said arm and said tongue member and secure the same thereagainst.

4,040,965

ROTARY FILTER SEPARATOR

Robert Kohlheb, Bovenden, Germany, assignor to Firma Supraton Aurer & Zucker OHG, Neuss, Germany

Filed July 6, 1976, Ser. No. 703,029
Claims priority, application Germany, July 3, 1975, 2529614
Int. Cl.[2] B01D *31/00*
U.S. Cl. 210—297 **7 Claims**



1. A rotary filter separator for continuous filtration comprising:

a. a cylindrical drum of predetermined diameter and length and mounted for rotation about a substantially vertical axis, said drum having means closing the lower end of said drum and including at least one port therein at a predetermined first radial distance from said axis and first annular means partially closing the upper end of said drum and defining an axially disposed first opening of predetermined second radial distance longer than said first radial distance,

b. a cylindrical filter element of smaller diameter and length than said drum axially mounted interiorally of said drum, said filter element having second annular means partially closing lower end of said filter element and third annular means partially closing the upper end of said filter element, said second and third annular means defining second and third axially disposed openings respectively, said

third opening having a predetermined third radial distance shorter than said first radial distance, whereby a first passage is defined between said closure means at the lower end of said drum and said second annular closure means, between the interior surface of said drum and the exterior surface of said filter element, and between said first and third annular closure means;

c. means defining a second passage within said filter element extending radially toward the interior surface of said filter element adjacent the upper end thereof, said second passage having an annular inlet spaced from the interior surface of said filter element a predetermined fourth radial distance which is greater than said first, second and third radial distances, and

d. means for feeding a solution to be filtered into said first passage between said closure means at the lower end of said drum and second annular closure means

e. whereby the solution is continuously filtered through said cylindrical element, the filtrate is conducted from said separator through said second passage and the concentrate is conducted from said first passage between said first and third annular closure means.

4,040,966

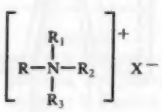
FABRIC SOFTENER

Roger C. Steinhauer, Park Forest, Ill., and Richard J. Bertozzi, Phoenix, Ariz., assignors to Armour-Dial, Inc., Phoenix, Ariz.

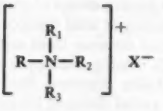
Filed Jan. 2, 1976, Ser. No. 645,871
Int. Cl.[2] D06M *13/46*
U.S. Cl. 252—8.8 **19 Claims**

1. A fabric softening composition comprising 0.1 to 35 weight percent of an amine oxide having the formula:

in which R is an alkyl radical containing a chain of from 8 to 22 carbon atoms and R_1 and R_2 are each methyl or ethyl, 0.1 to 45 weight percent of a first quaternary ammonium compound having the formula:



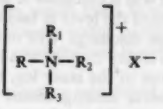
wherein R is an alkyl radical having a chain of 8 to 22 carbon atoms, R_1, R_2 and R_3 are each methyl or ethyl, and X is chlorine, bromine, fluorine, ethyl sulfate, methyl sulfate or SO_4, 0.1 to 60 weight percent of a second quaternary ammonium compound having the formula:



in which R is methyl, ethyl or 2-hydroxyethyl, preferably methyl,

R_1 and R_3 are each ethyl or methyl,

R_2 is $CH_2(CH_2CH_2O)_nH$, where n is from 8 to 41, and X is chlorine, bromine, iodine, ethyl sulfate, methyl sulfate or acetate, and 0.1 to 60 weight percent of a third quaternary ammonium compound having the formula:



in which:

R is phenylalkyl in which the alkyl group contains a chain of 8 to 22 carbon atoms,

R_1 and R_2 are each methyl or ethyl,

R_3 is methyl, ethyl, or phenylalkyl in which the alkyl group contains a chain of 8 to 22 carbon atoms, and

X is chlorine, bromine, iodine, ethyl sulfate or methyl sulfate, said percentages of said amine oxide first, second and third quaternary ammonium compounds being based on the dry weight of the respective compounds and the total weight of the composition, said amine oxide being contained in an amount of 35 to 65 weight percent based on the weight of the amine oxide and the total weight of the amine oxide and said first quaternary ammonium compound and said third quaternary ammonium compound containing at least in part an amount of compound containing two phenylalkyl groups in which each contains an alkyl radical of from 8 to 22 carbon atoms.

4,040,967

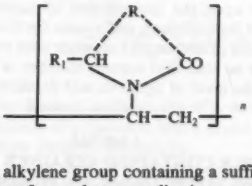
METHOD OF FRACTURING SUBTERRANEAN FORMATIONS PENETRATED BY A WELL

Kenneth H. Nimerick, and Benny E. Simpson, both of Tulsa, Okla., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 487,512, July 11, 1974. This application June 27, 1975, Ser. No. 591,196
Int. Cl.[2] E21B *43/26*; B01F *3/20, 1/00*
U.S. Cl. 252—8.55 R **1 Claim**

1. In a method of fracturing subterranean formations penetrated by a borehole, wherein an effective amount of a particulate water soluble organic polymer selected from the group consisting of natural gums and derivatives thereof, cellulosic derivatives, derivatives of starch, and polyacrylamide, is introduced into an aqueous liquid to thicken the liquid. said thickened liquid then being employed as a fracturing fluid, the improvement which comprises:

a. introducing said polymer into the aqueous liquid as a particulate coated with an efective quantity of a water soluble polyvinyl lactam, said polyvinyl lactam being selected from the group consisting of a polymer corresponding to the formula



wherein R is an alkylene group containing a sufficient number of carbon atoms to form a heterocyclic ring containing from 5 to 7 members, R_1 is hydrogen or a lower alkyl group and n is sufficient to provide a polymer having a molecular weight ranging from about 300 to 2,000,000 or a copolymer containing at least 20 percent by weight of N-vinyl lactam corresponding to the above formula and at least one other organic monomer to provide a copolymer having a molecular weight ranging from about 300 to 2,000,000, to increase the dispersibility of the water soluble organic polymer into the aqueous liquid; and

b. introducing a sufficient quantity of said resulting thickened aqueous liquid into said borehole and in contact with

said formation under sufficient pressure to fracture said formation.

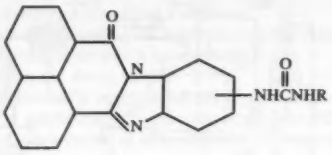
4,040,968

KETOHETEROBICYCLIC GREASE THICKENERS

Howard A. Harris, New York, N.Y., assignor to Shell Oil Company, Houston, Tex.

Filed Aug. 23, 1976, Ser. No. 716,614
Int. Cl.[2] C10M *1/32, 3/26, 5/20, 7/30*
U.S. Cl. 252—51.5 A **5 Claims**

1. A grease composition consisting essentially of a major account of a lubricating oil base vehicle and in an amount sufficient to thicken the base vehicle to grease consistency, a ketoheterobicyclic compound defind by the formula:



wherein R is an aliphatic hydrocarbyl radical of 16 to 22 carbon atoms.

4,040,969

HIGH SURFACE AREA CARRIER

Lewis O. Jones, Webster, N.N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed May 30, 1974, Ser. No. 474,623
Int. Cl.[2] G03G *9/00*
U.S. Cl. 252—62.1 R **8 Claims**

1. An electrostatographic developer mixture for use in magnetic brush development apparatus, said developer mixture comprising finely-divided toner particles electrostatically clinging to the surface of classified high surface area ferromagnetic carrier materials, said carrier materials having been classified as to have a specific surface area of at least about 150 cm^2/gram, a particle size volume distribution geometric standard deviation of less than about 1.3, and a particle size distribution wherein said carrier particles have an average particle diameter of less than about 100 microns, said carrier materials being further characterized as exhibiting improved triboelectric properties when mixed with said finely-divided toner particles.

4,040,970

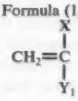
LIQUID DEVELOPER FOR DEVELOPING AN ELECTROSTATIC LATENT IMAGE

Terukuni Tsuneda, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 8, 1975, Ser. No. 575,720
Claims priority, application Japan, May 17, 1974, 49-55774
Int. Cl.[2] G03G *9/12*
U.S. Cl. 252—62.1 L **8 Claims**

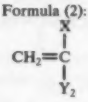
1. A liquid developer for developing an electrostatic latent image comprising an electrically insulating carrier liquid, a toner dispersed therein, and a copolymer for rendering the toner negatively charged composed of at least one member selected from the monomers of the formula (1) at least one member selected from the monomers of the formula (2) and at least one member selected from the monomers of the formula (3),

Formula (1):

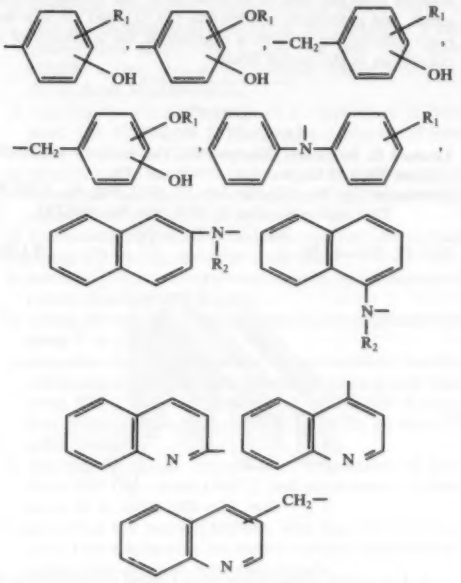


wherein X is selected from the class of H and CH_3 and Y_1 is selected from the class of $-C_nH_{2n+1}$, $-OC_nH_{2n+1}$ and $-COOC_nH_{2n+1}$, wherein n is an integer from 8 to 20;

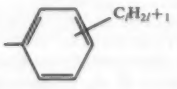
Formula (2):



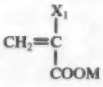
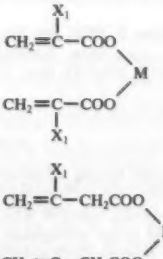
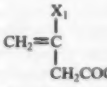
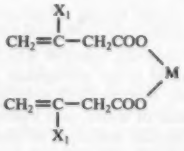
wherein X is selected from the class of H and CH_3 and Y_2 is selected from the class of the following:



wherein R_1 is selected from the class of H and $-C_nH_{2n+1}(1 \leqq n \leqq 4)$, and R_2 is selected from the class of H, $-C_mH_{2m+1}$

and


Formula (3):

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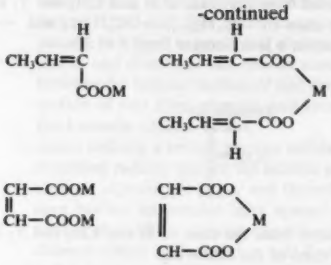


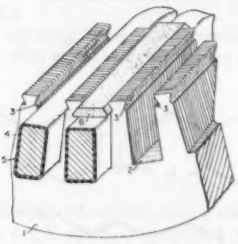
wherein X_1 is selected from H, CH_3 and COOM and M is selected from the class of an alkali metal and an alkaline earth metal, said monomers of formulae (1), (2), and (3) in a mole ratio sufficient to prevent a decrease in the solubility of the copolymer in the carrier liquid.

4,040,971

MAGNETIC WEDGE

Leonard B. Simmonds, Monroeville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Division of Ser. No. 219,663, Jan. 21, 1972, Pat. No. 3,976,902.
This application Jan. 6, 1976, Ser. No. 646,793
Int. Cl.² H01F *1/00*
U.S. Cl. 252—62.54 **9 Claims**



1. A magnetic wedge comprising a cured thermosetting resin system containing about 65 to about 75% by volume elongated magnetizable particles oriented in the direction of said wedge and having a length to diameter ratio of at least about 250.

4,040,972

ION-EXCHANGING ALUMINUM SILICATE WITH HYDROPHILIC SURFACES

Wolfgang Roebke, Altenstadt; Dieter Kneitel, and Erfried Parr, both of Rodenbach, all of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt and Henkel & Cie GumbH, Dusseldorf-Holthausen, both of Germany

Filed Mar. 5, 1976, Ser. No. 664,174
Claims priority, application Germany, Mar. 12, 1975, 2510675; Mar. 12, 1975, 2510742; Mar. 12, 1975, 2510676; Mar. 12, 1975, 2510741
Int. Cl.² C01B *33/28;* C02B *1/16, 1/44;* C11D *7/29*
U.S. Cl. 252—179 **20 Claims**

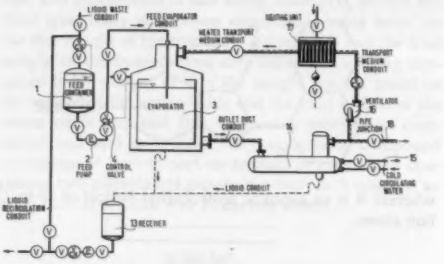
1. A process for the production of an ionexchanging alkali metal aluminum silicate having a hydrophilic surface comprising mixing a crystalline ion exchanging alkali metal aluminum silicate with a hydrophilic material which is ortho phosphoric acid, an alkali metal ortho phosphate, pentasodium tripolyphosphate, tartaric, acid, an alkali metal tartrate or pentaerythritol in the presence of water, said hydrophilic material being employed in an amount sufficient to impart hydrophilicity to the alkali metal aluminum silicate but not over 30% of the weight of the silicate, drying and subsequently grinding the treated silicate to a particle size of not over 100 microns.

4,040,973

PROCESS AND APPARATUS FOR THE CONCENTRATION AND STORAGE OF LIQUID RADIOACTIVE WASTES

Károly Szivós; Gyula Lovass; Läszlo Lipták; József Hirling, and Ozskár Pavlik, all of Budapest, Hungary, assignors to Magyar Tudomanyos Akademia Izotop Intezete, Budapest, Hungary

Filed Jan. 3, 1974, Ser. No. 430,585
Int. Cl.² C09K *3/00, 11/04*
U.S. Cl. 252—301.1 W **9 Claims**



1. An apparatus for evaporation of liquid components from a liquid radioactive waste and storage of the resulting pasty radioactive concentrate comprising a substantially cylindrical inner container having an open top for receiving said liquid radioactive waste, tangential inlet means located above the surface of the liquid radioactive waste within said inner container and adapted to inject a hot gaseous medium in a vortex stream into the entire vapor zone located above said liquid surface, a closed outer container arranged about said inner container, outlet means located at the lower part of said outer container for removing said gaseous medium carrying vapor from said vapor zone, a gas diverting spiral arranged in the space defined between said outer and said inner containers for directing said gaseous medium from said vapor zone along the outer surface of said inner container towards said outlet means, thereby transferring heat from said gaseous medium to said radioactive waste within said inner container, and a closed loop gas circulating system communicating said inlet and said outlet means during evaporation, said system being adapted to remove vapor from and subsequently apply heat to said gaseous medium.

4,040,974

SYNTHESIZED GELLANTS CONTAINING SMECTITE-TYPE CLAY AND PROCESS FOR PRODUCING SAME

Alan C. Wright, and Joseph Paul Rupert, both of Houston, Tex., assignors to N L Industries, Inc., New York, N.Y.

Filed Apr. 26, 1976, Ser. No. 680,593
Int. Cl.² B01J *13/00*
U.S. Cl. 252—316 **34 Claims**

1. A process for preparing a gellant consisting of a complex of a fluorine-containing trioctahedral smectite-type clay and an occluded amorphous phase selected from the group consisting of lithium hydroxide, sodium hydroxide, magnesium hydroxide, lithium oxide, sodium oxide, magnesium oxide, and mixtures thereof, said gellant containing mole ratios of Li, Na, Mg and Si, expressed as oxides, and F, of

$$a\mathrm{Li_2O}{:}b\mathrm{Na_2O}{:}c\mathrm{MgO}{:}d\mathrm{F}{:}8\mathrm{SiO_2} \qquad (I)$$

where $0.25 \leqq a < 1.1$, $0 \leqq b < 0.60$, $4.75 < c < 5.85$, $0.5 < d \leqq$

3.5, $0.6 \leq a+b < 1.25$, $6.0 < a+b+c < 6.65$, and said gellant being characterized as having a cation exchange capacity within the range from about 0.7 to 1.2 milliequivalents per gram, a Bingham Yield Value of at least about 50 dynes/cm.^{2} as a 2% dispersion in water, and the ability to disperse in deionized water within 15 minutes at a concentration of 2% by weight to produce a sol having a Bingham Yield Value less than 20 dynes/cm.^{2}, which sol is slowly converted to a thixotropic gel having a Bingham Yield Value above 50 dynes/cm.^{2}, said process comprising:

a. forming an aqueous suspension containing from 12 to 35% solids by weight, the solidss having the chemical composition represented by formula I, by: (i) combining and mixing magnesium oxide, water, hydrofluoric acid, and a base selected from the group consisting of lithium hydroxide, sodium hydroxide, and mixtures thereof, until the base is dissolved; and (ii) adding a silica sol;

b. agitating and heating the suspension until a viscous slurry is obtained from which no solids settle out;

c. allowing the slurry to gel;

d. hydrothermally reacting the gel under autogenous pressure at a temperature withir the range from 85° to about 250° C for a period of time sufficient to form said gellant; and

e. drying the solid obtained.

4,040,975

FOAM GENERATOR FOR FOAMING LIQUIDS

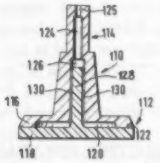
Adam Wittersheim, Nieder-Ramstadt-Trautheim, Germany, assignor to Goldwell GmbH Chemische Fabrik H.E. Dotter, Darmstadt-Eberstadt, Germany

Filed May 27, 1976, Ser. No. 690,458

Claims priority, application Germany, Feb. 3, 1976, 2604066; Apr. 1, 1976, 2614043

Int. Cl.^{2} B01J *13/00*; B01F *3/04*

U.S. Cl. 252—359 E **10 Claims**



1. A foam generator for foaming liquids including a housing element comprising:

a first housing constituting an upper housing including a peripheral disk portion;

a second housing constituting a lower housing including a peripheral disk portion;

one of said housings including a recessed area;

a protruding socket having a gas inlet bore therein;

said first housing having a cylindrically shaped recess connecting said recessed area with said gas inlet bore;

a retaining pin extending from said second housing through said recessed area into said cylindrically shaped recess and forming therewith at least one recess, said gas inlet bore and said at least one recess forming a continuous passageway connected with said recessed area; and

means connecting said housings together with said peripheral disk portion in mating relationship and said recessed area of said housing facing said other housing to form a hollow space between said housings whereby gas fed to said housing element through said gas inlet bore enters said recess and said hollow space and exits between said peripheral disk portions thereby forming air streams to foam the liquids.

4,040,976

PROCESS OF TREATING CARBONACEOUS MATERIAL WITH CARBON DIOXIDE

Marvin Greene, Somerset, N.J., assignor to Cities Service Company, Tulsa, Okla.

Filed July 6, 1976, Ser. No. 702,544

Int. Cl.^{2} C01B *2/14*; C01J *3/00*

U.S. Cl. 252—373 **5 Claims**

1. A non-catalytic process of reacting solid carbonaceous material with carbon dioxide to produce a carbon monoxide-containing gas, comprising

a. contacting the carbonaceous material with carbon dioxide,

b. adding the mixture of carbon dioxide and carbonaceous material to a reactor at a temperature of about 2° to about 300° C,

c. contacting the material mixture with hot carbon dioxide to heat the carbonaceous material in the mixture at a rate greater than about 500° C./sec. but less than about 250,000° C./sec., thus giving a preheat time of from about 0.1 to about 50 milliseconds,

d. reacting the reactor contents at a temperature of from about 535° C. to about 1100° C. and at a pressure of from about 50 to about 3000 psig, and,

e. quenching the reaction mixture, with the total residence time of the reactants in the reactor varying from about 10 milliseconds to about 5000 milliseconds.

4. A non-catalytic process of making a synthesis gas mixture comprising CO and H_2, the steps comprising:

a. contacting a solid carbonaceous material with a mixture of carbon dioxide and hydrogen,

b. adding the mixture of (a) to a reactor at a temperature of about 2° to about 300° C,

c. contacting the mixture with hot carbon dioxide to heat the carbonaceous material in the mixture at a rate greater than about 500° C./sec. but less than about 250,000° C./sec., thus giving a preheat time of from about 0.1 to about 50 milliseconds,

d. reacting the reactor contents at a temperature of from about 535° C. to about 1100° C. and at a pressure of from about 50 to about 3000 psig, and,

e. quenching the reaction mixture, with the total residence time of the reactants in the reactor varying from about 10 milliseconds to about 5000 milliseconds.

4,040,977

PRESERVATIVE AND DISINFECTANT

Heinz Eggensperger, Hamburg, and Karl-Heinz Diehl, Norderstedt, both of Germany, assignors to Sterling Drug Inc., New York, N.Y.

Continuation-in-part of Ser. No. 511,643, Oct. 3, 1974, abandoned. This application Apr. 5, 1976, Ser. No. 673,862

Claims priority, application Germany, Oct. 16, 1973, 2351821

Int. Cl.^{2} C09K *15/16*; A61L *9/00*; C02B *3/08*

U.S. Cl. 252—401 **30 Claims**

1. An aqueous preservative and disinfectant composition comprising acetamide-alcohol-formaldehyde condensation products prepared by reacting in water, in the presence of a basic catalyst in an amount sufficient to catalyze the condensation and for a time and at a temperature sufficient to form the condensation products, (a) an acetamide selected from 2-haloacetamide, thiocyanoacetamide and mixtures of said acetamides; (b) an alcohol selected from saturated alkanols, unsaturated alkanols, cycloalkanols, aralkanols unsubstituted on aryl or substituted on aryl by one or two halo substituents, aroxyalkanols, lower-alkoxyalkanols, diethylene glycol mono-lower-alkyl ethers, triethylene glycol, alkanols substituted by one or two substituents selected from bromo and chloro, nitroalkanols, and mixtures of said alcohols; and (c) formaldehyde.

4,040,978

PRODUCTION OF (AMM)OXIDATION CATALYST

Tao P. Li, Chesterfield, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Nov. 28, 1975, Ser. No. 636,011
Int. Cl.[2] B01J *27/14*
U.S. Cl. 252—437 10 Claims

1. A process for the production of an (amm) oxidation catalyst comprising: Individually forming the molybdate of at least one of the elements in the group consisting essentially of cobalt, nickel and iron and an oxide or salt of bismuth; thereafter forming an aqueous slurry consisting essentially of the individual molybdates and bismuth oxide or salt; separating the solid phase from the slurry, and calcining the solid phase to form the catalyst.

4,040,979

HYDROCARBON CONVERSION CATALYTIC COMPOSITE

Stanley A. Gembicki, Western Springs, Ill., and John I. Hammerman, Ardmore, Okla., assignors to UOP Inc., Des Plaines, Ill.

Filed Feb. 23, 1976, Ser. No. 660,749
Int. Cl.[2] B01J *27/02, 29/06*
U.S. Cl. 252—439 5 Claims

1. A catalytic composite comprising a combination of a nickel component, and tungsten component with a silica-alumina carrier material wherein the atomic ratio of nickel to nickel plus tungsten is about 0.1 to about 0.3.

5. A catalytic composite comprising a combination of the catalyst composite of claim 1 with a sulfur component in amounts sufficient to incorporate about 0.05 to about 1 wt. % sulfur, calculated on an elemental basis.

4,040,980

REDUCED COPPER CATALYST ON SUPPORT

Ken Matsuda, and William Austin Barber, both of Stamford, Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed Nov. 28, 1975, Ser. No. 636,289
Int. Cl.[2] B01J *21/04, 23/72*
U.S. Cl. 252—463 7 Claims

1. A method of making reduced copper catalyst supported on a water-insoluble, porous catalyst support, said method comprising the steps:

a. impregnating said catalyst support with a solution of cuprous compound dissolved in a solvent selected from acetonitrile and acrylonitrile, and
b. evaporating the solvent from the support, leaving cuprous compound deposited on the support, and
c. reducing the cuprous compound on the support to copper in situ by contacting the impregnated support with a reducing agent.

4,040,981

PROCESS FOR PRODUCING DENITRATING CATALYSTS

Hideya Inaba; Masayoshi Ichiki, and Yoshinori Wakiyama, all of Osaka, Japan, assignors to Hitachi Shipbuilding & Engineering Co., Ltd., Osaka, Japan

Filed June 24, 1976, Ser. No. 699,472
Claims priority, application Japan, June 30, 1975, 50-81339
Int. Cl.[2] B01J *21/04, 23/74, 23/86*
U.S. Cl. 252—463 11 Claims

1. A process for producing a denitrating catalyst comprising the steps of plating the surface of unactivated metal with aluminum to form a first layer containing the metal diffused in the aluminum and a second layer containing the aluminum diffused in the metal, immersing the resulting layered product in an aqueous aluminum-dissolving solution to dissolve out the aluminum into the aqueous solution, and contacting the metal from which all or part of the aluminum is dissolved out with a gas containing sulfurous acid gas to thereby activate the surface of the unactivated metal.

4,040,982

OZONIZATION CATALYST

Michael R. Basila, Munster, Ind., and Frank R. Broersma, Fullerton, Calif., assignors to Nalco Chemical Company, Oak Brook, Ill.

Filed Jan. 12, 1976, Ser. No. 648,133
Int. Cl.[2] B01J *21/04, 23/74*
U.S. Cl. 252—466 J 2 Claims

1. An ozonization catalyst consisting essentially of 1% to 20% by weight of ferric oxide supported on catalytically active alumina, said catalyst being water insoluble and having a surface area of 150–450 square meters per gram and a pore volume of at least 0.3 cc per gram.

4,040,983

OXIDATION CATALYSTS AND PROCESS FOR PREPARING SAME

Robert A. Innes, Pittsburgh, and Anthony J. Perrotta, Monroeville, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Dec. 30, 1975, Ser. No. 645,419
Int. Cl.[2] B01J *21/00, 23/18*
U.S. Cl. 252—469 12 Claims

1. The novel compound defined by the formula:

$$USb_{3-x}A_xO_{9-10}$$

wherein A is a Group IV B element, x is the number about 0.25 to about pb 1.50.

4,040,984

ELECTROCONDUCTIVE POLYSALT COMPLEXES

Andrew Jackson Sharpe, Jr., McMurray; Robert H. Windhager, Pittsburgh, and Kathleen Seese Hearp, Trafford, all of Pa., assignors to Calgon Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 576,901, May 12, 1975, abandoned.
This application Oct. 27, 1976, Ser. No. 735,857
Int. Cl.[2] H01B *1/00*
U.S. Cl. 252—500 6 Claims

1. The method of making conductivized materials which comprises applying to the material to be conductivized an effective quantity of an electroconductivizing agent comprising a polysalt complex consisting essentially of (A) a cationic component of a water soluble, strongly cationic quaternary ammonium homopolymer or copolymer of poly-(dimethyl diallyl ammonium chloride); and (B) an anionic component of a water soluble, weakly anionic material comprising (a) a water soluble, weakly anionic polymeric carboxylic acid selected from homopolymers and copolymers of acrylic acid and of maleic acid; or (b) a water soluble, weakly anionic multifunctional carboxylic acid selected from maleic acid, succinic acid and glutaric acid; or (c) mixtures of (a) and (b); said weakly anionic materials being characterized by having a pK value greater than 3; and wherein the ratio of equivalents of the anionic component to the cationic component is 0.01 to 10.0, and the polysalt complex forms a stable, homogeneous aqueous solution.

4,040,985

PHOTOCONDUCTIVE FILMS

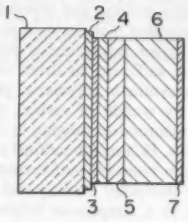
Keiichi Shidara, Tama; Naohiro Goto, Machida; Eiichi Maruyama, Kodaira; Tadaaki Hirai, Koganei, and Tsutomu Fujita, Mobara, all of Japan, assignors to Hitachi, Ltd. and Nippon Hoso Kyokai, both of, Japan

Filed Apr. 6, 1976, Ser. No. 674,086

Claims priority, application Japan, Apr. 16, 1975, 50-45198

Int. Cl.[2] H01L *31/00*

U.S. Cl. 252—501 3 Claims



1. A photoconductive film comprising;

a first region having a thickness in a range greater than 100 A and containing Se in which Te and elements capable of forming deep levels in Se are added at concentrations lower than 10 atomic % inclusive on an average, respectively,

a second region disposed on said first region, said second region having a thickness in a range between 200 A and 5000 A and containing Se in which Te is added with a continuous distribution of concentration having a peak value greater than 15 atomic % inclusive,

a third region disposed on said second region, said third region having a thickness in a range between 500 A and 3,000 A and containing Se in which at least one element capable of forming deep levels in Se is added with a continuous distribution of concentration having a peak value greater than 15 atomic % inclusive, and

a fourth region disposed on said third region and containing Se in which Te and at least one element capable of forming deep levels in Se are added at concentrations lower than 10 atomic % inclusive on an average, respectively, said at least one element capable of forming the deep levels in Se being selected from the group consisting of As, Sb, Bi, Se, Ge, and a mixture thereof.

4,040,986

PREPARATION OF 4-METHOXYBENZONITRILE PERFUME COMPOSITIONS

Harmannus Boelens; Hendrik J. Takken, both of Huizen, and Petrus C. Traas, Naarden, all of Netherlands, assignors to Naarden International N.V., Naarden-Bussum, Netherlands

Filed Feb. 3, 1976, Ser. No. 654,936

Claims priority, application Netherlands, Feb. 11, 1975, 7501607

Int. Cl.[2] C11B *9/00*

U.S. Cl. 252—522 2 Claims

1. A process for the production of perfume compositions, comprising admixing perfume components usual for this purpose and 4-methoxybenzonitrile in an amount of 0.0001–10% by weight.

4,040,987

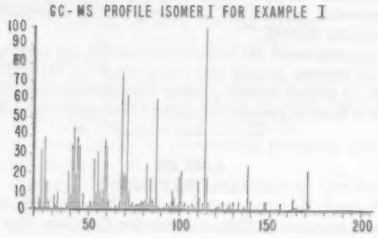
2-ALKYL-SUBSTITUTED-4,5-DIMETHYL THIAZOLINE PERFUME AND COLOGNE COMPOSITIONS

Edward J. Shuster, Brooklyn, N.Y.; Donald Arthur Withycombe, Lincroft, N.J.; Braja Dulal Mookherjee, Holmdel, N.J., and Cynthia J. Mussinan, Bricktown, N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

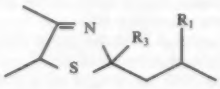
Filed Oct. 7, 1976, Ser. No. 730,653

Int. Cl.[2] C11B *9/00*

U.S. Cl. 252—522 6 Claims



1. A perfumed composition comprising a perfuming quantity of a 2-alkyl-substituted-4,5-dimethyl thiazoline having the structure:



wherein R_1 and R_3 are the same or different and each is selected from the group consisting of hydrogen and methyl, and at least one adjuvant selected from the group consisting of natural perfume oils, synthetic perfume oils, alcohols, aldehydes, ketones, nitriles, esters and lactones.

4,040,988

BUILDER SYSTEM AND DETERGENT PRODUCT

Richard W. Benson, Cincinnati; Steven D. Cherney, Springdale, and Everett J. Collier, Cincinnati, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Sept. 27, 1974, Ser. No. 509,866

Int. Cl.[2] E11D *3/065*

U.S. Cl. 252—532 37 Claims

1. A granular detergent additive consisting essentially of:

a. from about 0.5% to about 60% by weight of submicron calcium carbonate particles;

b. from about 0.5% to about 80% by weight of a first builder component selected from the group consisting of the alkali metal carbonates, bicarbonates, and sesquicarbonates and mixtures thereof;

c. from about 5% to about 70% by weight of a sequestering builder selected from the group consisting of the alkali metal pyrophosphates, tripolyphosphates, nitrilotriacetates, and citrates, and mixtures thereof; and

d. from about 5% to about 40% by weight of an alkali metal silicate having a $M_2O:SiO_2$ ratio of from about 1:2 to about 1:3.75 wherein M is an alkali metal;

wherein component (a) and component (b) are combined to form one discrete granule and component (c) and component (d) are present as a second discrete granule wherein the second discrete granule is dried to a moisture content of less than about 7% by weight.

15. A granular detergent product consisting essentially of:

a. from about 0.5% to about 50% by weight of submicron calcium carbonate particles;

b. from about 5% to about 70% by weight of a first builder

component selected from the group consisting of the alkali metal carbonates, bicarbonates, and sesquicarbonates and mixtures thereof;

c. from about 5% to about 70% by weight of a sequestering builder selected from the group consisting of the alkali metal pyrophosphates, tripolyphosphates, nitrilotriacetates, and citrates, and mixtures thereof;

d. from about 5% to about 40% by weight of an alkali metal silicate having a $M_2O:SiO_2$ ratio of from about 1:2 to about 1:3.75 wherein M is an alkali metal; and

e. from about 5% to about 40% by weight of a water-soluble detergent selected from the group consisting of anionic, nonionic, zwitterionic, and ampholytic detergents, and mixtures thereof;

wherein component (a) and component (b) are combined to form one discrete granule and components (c), (d), and (e) are present as a second discrete granule wherein the second discrete granule is dried to a moisture content of less than 7% by weight.

4,040,989
LIQUID DETERGENT

Jean Renaud, Bougival, and Jean-Paul Narcy, Paris, both of France, assignors to Colgate-Palmolive Company, New York, N.Y.

Filed May 13, 1974, Ser. No. 469,382
Claims priority, application France, May 25, 1973, 73.19155
Int. Cl.² C11D *1/86*
U.S. Cl. 252—548 **7 Claims**

1. A liquid dishwashing detergent having a medium or medium-low foam volume that is stable in the presence of grease soil which consists essentially of:

a. a detergent selected from the group consisting of 25% to 40% by weight of a water-soluble C_{10}–C_{20} paraffin sulfonate, 15% to 30% by weight of a water-soluble linear C_8–C_{15} alkyl benzene sulfonate, and 20% to 40% by weight of a mixture thereof;

b. 5% to 30% by weight of a nonionic detergent selected from the group consisting of a condensate of C_{10}–C_{16} alkanol with a heteric mixture of ethylene oxide and propylene oxide in a weight ratio from 2.5:1 to 4:1 respectively, said condensate having a 60 to 85% content of ethylene oxide and propylene oxide, a C_2–C_6 alkyl ether of an ethoxylated C_6–C_{10} alkyl phenol having 9 to 14 ethenoxy groups, and mixtures thereof;

c. 1% to 8% by weight of a C_1–C_3 alkanolamide of a C_{10}–C_{16} alkanoic acid; and

d. an aqueous medium; the total content of (a), (b), and (c) being from 35 to 50% by weight of the composition.

4,040,990
PARTIALLY PYROLYZED MACROPOROUS POLYMER PARTICLES HAVING MULTIMODAL PORE DISTRIBUTION WITH MACROPORES RANGING FROM 50–100,000 ANGSTROMS

James W. Neely, Levittown, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 550,495, Feb. 18, 1975, abandoned. This application Jan. 26, 1976, Ser. No. 652,019
Int. Cl.² C08J *9/00;* **B01J** *1/22*
U.S. Cl. 260—2.1 R **10 Claims**

1. Partially pyrolyzed particles of a macroporous synthetic polymer having properties suitable for use in adsorption, molecular screening and/or catalysis and high resistance to crushing and particle sloughage comprising the product of controlled thermal degradation of a macroporous synthetic polymer containing macorpores ranging from between about 50 to about 100,000 Angstroms in average critical dimension, a carbon-fixing moiety, and derived from one or more ethyleneically unsaturated monomers, or monomers which may be condensed to yield macroporous polymers, or mixtures thereof, which partially pyrolyzed particles have: (a) at least 85% by weight of carbon, (b) multimodal pore distribution with macropores ranging in size from about 50 A to about 100,000 A in average critical dimension and (c) a carbon to hydrogen atom ratio of between about 1.5 : 1 and about 20 : 1.

9. A process for producing partially pyrolyzed particles of a macroporous synthetic polymer having properties suitable for use in adsorption, molecular separations, and/or catalysis and high resistance to crushing and particle sloughage which comprises thermally degrading at a temperature between about 300° C and about 900° C and in an inert gaseous atmosphere optionally containing an activating gas, a macroporous synthetic polymer containing macropores ranging from between about 50 to about 100,000 Angstroms in average critical dimension, a carbon-fixing moiety, and derived from one or more ethylenically unsaturated monomers or monomers which may be condensed to yield macroporous polymers or mixtures thereof for a time sufficient to drive off sufficient volatile components of the synthetic polymer to yield particles having: (a) at least 85% by weight of carbon, (b) multimodal pore distribution with macropores ranging in size from about 50 A to about 100,000 A in average critical dimension and (c) a carbon to hydrogen atom ratio of between about 1.5 : 1 and about 20 : 1, and thereafter cooling said particles under said inert atmosphere to a temperatur below that which would cause oxidation in air.

4,040,991
POLYURETHANE FOAM RECONSTITUTION

Edwin W. Wiggins, Bridgeton, and James F. Carpenter, St. Louis County, both of Mo., assignors to McDonnell Douglas Corporation, St. Louis, Mo.

Filed Dec. 10, 1973, Ser. No. 423,152
Int. Cl.² C08G *18/14;* **B64C** *3/34*
U.S. Cl. 260—2.5 BD **7 Claims**

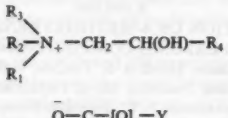
1. The process of treating reticulated polyester urethane foam materials positioned in a fuel tank, said foam containing molecular linkages which have undergone hydrolysis and partial reversion comprising passing a reconstitution diisocyanate or polyfunctional epoxy compound through the fuel tank, and contacting the hydrolyzed polyurethane foam with said reconstitution material to produce a reconstituted foam structure in situ.

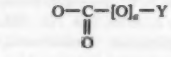
4,040,992
CATALYSIS OF ORGANIC ISOCYANATE REACTIONS

Ibrahim S. Bechara, Boothwyn; Felix P. Carroll, Chester; Dewey G. Holland, Chadds Ford, and Rocco L. Mascioli, Media, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed July 29, 1975, Ser. No. 600,015
Int. Cl.² C08G *18/18*
U.S. Cl. 260—2.5 AW **25 Claims**

1. In the process of promoting organic isocyanate condensation and/or polymerization reactions in the production of products containing respectively urethane and isocyanurate groups, the improvement which consists in utilizing for such promotion a catalytic quantity of a hydroxyalkyl quaternary ammonium compound corresponding to the general formula





wherein a = zero or one

R_1, R_2 and R_3 are independently alkyl or hydroxyalkyl of 1 to 20 carbon atoms, or cycloalkyl groups of 3 to 8 carbon atoms, aralkyl, aryl, alkenyl of 2 to 20 carbon atoms, or alkynyl of 2 to 6 carbon atoms, or

R_1, R_2 and R_3 together constitute a heterocyclic structure

from the group consisting of quinuclidine, N-methyl morpholine, N-ethyl morpholine and N,N'-dimethyl piperazine;

R_4 is H, phenyl, an alkyl group of 1 to 15 carbon atoms, an alkenyl group of 2 to 15 carbon atoms, an alkynyl group of 2 to 6 carbon atoms, a hydroxy alkyl group of 1 to 9 carbon atoms, a keto alkyl group having a total of 3 to 15 carbon atoms; or an alkoxy alkyl group having a total of 2 to 10 carbon atoms;

Y is H, an alkyl group of 1 to 20 carbon atoms, an alkenyl group of 2 to 15 carbon atoms, a cycloalkyl group of 3 to 6 carbon atoms, phenyl, an alkyl phenyl having 1 to 9 carbon atoms in the alkyl group or groups attached to the phenyl ring, benzyl, an alkyl benzyl having 1 to 9 carbon atoms in the alkyl group or groups attached to the ring, or a

$CH_{(3-b)}Z_{(b)}$ group,

wherein (3_b) b = 1 to 3 and Z is OH, CN, Cl, an alkoxy group of 1 to 5 carbon atoms, a phenyl group or methoxy phenyl group, or Z is

$(CH_2)_dCOOR$,

wherein *d* is equal to zero to four and R is hydrogen or an alkyl group of up to 20 carbon atoms.

4,040,993

LOW DISSIPATION FACTOR ELECTROSTATIC EPOXY WIRE COATING POWDER

Irving N. Elbling, Pittsburgh, and Howard E. Saunders, Penn Hills, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 25, 1976, Ser. No. 661,074
Int. Cl.[2] C08L *63/00, 91/00*
U.S. Cl. 260—18 EP 12 Claims

1. A coating powder made by

A. preparing by dry mixing a composition which comprises:
   1. about 20 to about 80 phr of a first diglycidyl ether of bisphenol A having an E.E.W. of at least 1600 and a Durran's softening point of at least 113° C;
   2. about 10 to about 60 phr of a second diglycidyl ether of bisphenol A having an E.E.W. of 700 to 900 and a Durran's softening point of at least 112; and,
   3. about 5 to about 50 phr of a third digylycidyl ether of bisphenol A having an E.E.W. of less than 1000 and a Durran's softening point of less than 105° C;
   4. about 10 to about 60 phr of a pre-prepared epoxy ester, the epoxy portion of said ester being derived from a diglycidly ether of bisphenol A having an E.E.W. of at least about 400 and a Durran's softening point of at least about 70, and the ester portion being derived from a dibasic acid having the formula $HOOC—(CH_2)_m—COOH$, where *m* is about 18 to about 54; and
   5. about 5 to about 20 phr of a curing agent for said diglycidyl ethers, at least about 10% by weight of the anhydride equivalent weight of said curing agent being selected from the group consisting of trimellitic anhydride, esterified trimellitic anhydride, and mixtures thereof;

B. hot melt mixing said composition;

C. cooling said composition to form a solid;

D. grinding said composition into a powder having a particle size of about 5 to about 149 microns.

4,040,994

CURED EPOXY RESINS

Morton Lewis, Elmhurst, and John F. Rohrer, Lombard, both of Ill., assignors to Unitech Chemical Inc., Chicago, Ill.

Filed Nov. 26, 1976, Ser. No. 745,454
Int. Cl.[2] C08G *59/02*
U.S. Cl. 260—18 PF 10 Claims

1. A thermosetting epoxy resin comprising the reaction product of (a) from about 25 to 75% by weight (basis total epoxy content) of a non-fatty polyepoxide compound, having reactive 1,2-epoxy groups (b) from about 25 to 75% by weight (basis total epoxy content) of at least two epoxidized fatty acid esters, and (c) from about 0.4 to 1.2 chemical equivalents (basis total epoxy content) of a polycarboxylic acid anhydride curing agent.

4,040,995

HIGH SOLIDS OVERPRINT VARNISH

Kazys Sekmakas, and George E. Gotschall, both of Chicago, Ill., assignors to DeSoto, Inc., Des Plaines, Ill.

Filed Aug. 9, 1976, Ser. No. 712,697
Int. Cl.[2] C09D *3/52, 3/66*
U.S. Cl. 260—22 CQ 19 Claims

1. A fluid overprint varnish containing less than about 30% of volatile organic solvent and which cures on baking, said varnish consisting essentially of a mixture of:

1. an hydroxy functional, oil-modified polyester resin consisting essentially of;
   A. a polyhydric alcohol containing at least four hydroxy groups per molecule;
   B. diol having a neo-structure, said diol being 2,2-dimethyl-3-hydroxypropyl-2,2-dimethyl-3-hydroxypropionate;
   C. a dicarboxylic acid component; and
   D. a saturated oil or fatty acid derived therefrom;
   the oil-modified polyester having an equivalent ratio of carboxyl to hydroxyl functionalities of from 0.5 to 0.8 equivalents of carboxyl per equivalent of hydroxyl, said neo-structured diol providing from 20% to 45% of the total hydroxy functionality in said polyester, and the fatty acid in said oil or fatty acid providing from 10 to 40% of the total carboxyl functionality in the polyester,
2. liquid low volatile diol; and
3. liquid hexafunctional melamine resin; said oil-modified polyester constituting from about 10 – 50% of the mixture, the liquid diol constituting from about 10 – 40% of the mixture, and the balance of the mixture of the three components consisting essentially of said liquid melamine resin.

4,040,996

METHOD OF INCORPORATING PROCESSING ADDITIVES IN POLYVINYL CHLORIDE RESINS AND EMULSION FOR USE THEREIN

Nicolaas C. Van Vonno, Mountain Lakes, N.J., assignor to American Hoechst Corporation, Bridgewater, N.J.

Filed Mar. 9, 1976, Ser. No. 665,176
Int. Cl.[2] C08L *91/00*
U.S. Cl. 260—23 XA 15 Claims

1. The method of making a polyvinyl chloride molding composition which comprises adding to a body of particulate polyvinyl chloride an aqueous emulsion of a lubricating amount of a processing lubricant and a stabilizing amount of a stabilizer and mixing the resulting mixture at an elevated temperature to evaporate the water of the emulsion and the coat the polyvinyl chloride particles with said lubricant and stabilizer.

4,040,997

METHOD FOR INCORPORATING PROCESSING ADDITIVES IN POLYVINYL CHLORIDE RESINS AND ADDITIVE CONCENTRATE FOR USE THEREIN

Nicolaas C. Van Vonno, Mountain Lakes, and John O. Allaire, Milford, both of N.J., assignors to American Hoechst Corporation, Bridgewater, N.J.

Filed Mar. 9, 1976, Ser. No. 665,177
Int. Cl.[2] C08L *91/00*
U.S. Cl. 260—23 XA 17 Claims

1. The method of making a polyvinyl chloride molding

composition which comprises preparing an aqueous emulsion containing from 10% to 45% by weight of a processing lubricant and from 3% to 30% by weight of stabilizer, mixing said emulsion with a finely divided particulate solid selected from fillers, pigments and mixtures thereof to form an additive concentrate in the form of a free-flowing powder containing no more than 30% by weight of water and mixing a portion of said concentrate with polyvinyl chloride to form said polyvinyl chloride molding composition.

4,040,998

AQUEOUS DISPERSION OF CERAMIC SLURRY

Joseph Nemeth, St. Clair Shores, Mich., assignor to Champion Spark Plug Company, Toledo, Ohio

Filed July 17, 1975, Ser. No. 596,897
Int. Cl.[2] C08L *83/04*
U.S. Cl. 260—29.2 M **2 Claims**

1. An aqueous dispersion consisting essentially of from 50 to 90 parts by weight alumina, from ½ to 6 parts by weight flux, from 6 to 45 parts by weight silicone resin which consists essentially of a phenyl lower alkyl silicone resin wherein the total of phenyl and lower alkyl groups divided by the number of silicon atoms is from 0.9 to 1.5 and each alkyl group has not more than 4 carbon atoms, from ½ to 7 parts by weight detergent which is a combined alkylolamine condensate of an intermediate fatty acid and alkylolamine soap of a higher fatty acid, and sufficient water that said dispersion has a viscosity at 25° C. of from 300 to 3,000 centipoises.

4,040,999

POLLUTION FREE METHOD OF MAKING PHENOL FORMALDEHYDE RESOLE TIRE CORD DIP AND PRODUCT

Edward Florent Kalafus, Akron, and Satish Chander Sharma, Mogadore, both of Ohio, assignors to The General Tire & Rubber Company, Akron, Ohio

Filed June 3, 1976, Ser. No. 692,242
Int. Cl.[2] C08L *61/10, 61/12*
U.S. Cl. 260—29.3 **13 Claims**

1. A process for making a cord dip containing a phenol formaldehyde resin which comprises:

A. reacting in the presence of 0.01 to 0.8 moles of a base catalyst
   1. one mole of phenol with
   2. from about 1.0 to 4.0 moles of formaldehyde to form a reaction mixture containing phenol formaldehyde resin.

B. without separating the phenol formaldehyde resin from the reaction mixture adding based on the following ingredients by dry weight
   1. a minor amount of a curing agent selected from the group consisting of resorcinol and resorcinol formaldehyde resin and
   2. a major amount of an alkaline dispersion of a rubbery vinyl pyridine 1,3-butadiene copolymer in which copolymer the vinyl pyridine is present as a minor component.

4,041,000

MAKING FIREPROOF NON-POLLUTING LIQUID COATING COMPOSITION

Alexander Farcnik, 9850 Reseda Blvd., Apt. 311, Northridge, Calif. 91403

Filed Dec. 12, 1975, Ser. No. 640,287
Int. Cl.[2] C08L *31/04*
U.S. Cl. 260—29.6 B **9 Claims**

1. An improved fireproof non-polluting liquid coating composition, said composition consisting essentially of:

a. water as a vehicle;
b. a silica-containing refractory material in granular form;
c. pollution-free silicate selected from the group consisting of calcium silicate, sodium silicate and mixtures thereof;
d. a thermoplastic resin binder;
e. zinc oxide in granular form; and,
f. alkali metal fluorosilicate drying agent.

4,041,001

WASH-RESISTANT ANTISTATIC COATING COMPOSITIONS

Chester D. Szymanski, Martinsville, and Ronald DeMartino, Wayne, both of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Filed Nov. 25, 1974, Ser. No. 526,820
Int. Cl.[2] C08L *25/18*
U.S. Cl. 260—29.6 WA **4 Claims**

1. An antistatic coating composition consisting essentially of an aqueous solution of a combination of water dispersible polyhydroxy organic compound selected from the group consisting of aliphatic diols, triols and tetrols and their condensation polymers, cyclic diols and triols and polymeric polyhydroxy compounds; and polystryrene sulfonic acid having a degree of substitution of from about 0.7 to 1.0 and an average molecular weight of from about 20,000 to 7,000,000, said polyhydroxy compound and said polystryrene sulfonic acid each being present in a concentration of from about 0.1 to 10.0%, by weight, and a ratio of from 1 to 5 and 5 to 1, by weight.

4,041,002

THERMOPLASTIC RESIN COMPOSITION

Michihiro Aboshi, Tokyo; Tsutomu Kakutani, Tama; Katsumi Yoshitake, Kawasaki, and Toshinori Koseki, Tokyo, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Continuation-in-part of Ser. No. 452,690, March 19, 1974, abandoned, which is a continuation-in-part of Ser. No. 429,083, Dec. 28, 1973, abandoned. This application Aug. 1, 1975, Ser. No. 601,173
Int. Cl.[2] C08K *5/01, 5/09, 5/10, 5/49*
U.S. Cl. 260—30.6 R **5 Claims**

1. A thermoplastic resin composition having excellent lubricity and wear resistance comprising from 55 to 99.5 percent by weight of thermoplastic polyacetal, from 0.3 to 25 percent by weight of a liquid lubricant which does not dissolve the resin, and from 0.2 to 20 percent by weight of an ethylene-vinyl acetate copolymer which contains from 15 to 50 percent by weight of vinyl acetate comonomer.

4,041,003

PROCESS FOR MOLDING AROMATIC POLYCARBONATES HAVING PERFLUOROALKANESULPHONIC ACID DERIVATIVES AS MOLD RELEASE AGENTS

Siegfried Adelmann, Krefeld; Dieter Margotte, Krefeld-Fischeln; Hugo Vernaleken, Krefeld-Bockum; Hans Niederprüm, Monheim, Rhineland; Johann Nikolaus Meussdoerffer, and Werner Nouvertne, both of Krefeld, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Feb. 9, 1976, Ser. No. 656,229
Claims priority, application Germany, Feb. 18, 1975, 2506726
The portion of the term of this patent subsequent to Feb. 8, 1994, has been disclaimed.
Int. Cl.[2] C08K *5/36*
U.S. Cl. 260—30.8 R **8 Claims**

1. In a process for molding thermoplastic, high molecular weight, aromatic polycarbonates, the improvement which comprises adding to the aromatic polycarbonate from about 0.001 to 1% by weight of a mold release agent selected from the group consisting of perfluoro-alkanesulphonic acid amides and cyclimmonium salts of perfluoro-alkanesulphonic acids.

4,041,004

POLYEPOXY-3,3',4,4'-BENZHYDROL TETRACARBOXYLIC DIANHYDRIDE LAMINATING RESINS

Walter P. Barie, Jr., Shaler Township, Allegheny County; Anatoli Onopchenko, Monroeville, and Johann G. D. Schulz, Pittsburgh, all of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Dec. 20, 1974, Ser. No. 534,901
Int. Cl.[2] C08K 5/07
U.S. Cl. 260—32.8 EP 9 Claims

1. A stable, substantially non-reacted and carboxyl-free resin solution for impregnating reinforcing material in the preparation of reinforced laminates comprising

a nonplasticizing 1,2-epoxy resin which contains on the average more than one 1,2-epoxy group per molecule,

sufficient anhydride hardener component for an A/E ratio of between about 0.4 and about 1.0, said anhydride hardener component comprising

about 15 to 100 weight percent 3,3',4,4'-benzhydrol tetracarboxylic dianhydride and

up to about 85 percent of a nonplasticizing monoanhydride, and

from about 30 to about 85 weight percent of the total solution of a solvent having a boiling point no greater than about 110° C. selected from a lower alkyl ketone having up to five carbon atoms, a lower alkyl carboxylic acid ester having up to five carbon atoms, a chlorinated hydrocarbon having up to two carbon atoms, an aromatic hyrocarbon having up to seven carbon atoms, and mixtures thereof; said stable solution being at a temperature no higher than about 50° C.

4,041,005

IMPACT IMPROVEMENT OF RUBBER-MODIFIED NITRILE RESINS

Herbert Talsma, Cleveland Heights, and William M. Giffen, Jr., Aurora, both of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Filed Jan. 15, 1976, Ser. No. 649,222
Int. Cl.[2] C08K 5/05, 5/06, 5/07
U.S. Cl. 260—32.8 A 10 Claims

1. An impact-resistant resin composition comprising an intimate mixture of from 1 to 30 parts by weight of an essential oil and 100 parts by weight of a resin resulting from the polymerization of a major proportion of an unsaturated nitrile in the presence of a preformed rubber component and optionally a minor proportion of at least one other polymerizable component.

4,041,006

FLOCCULANT COMPOSITION AND PROCESS

Ronald A. Fong, Levittown; James A. Latty, Wallingford, and Roger P. McDonnell, Warminster, all of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 571,884, April 25, 1975, abandoned. This application Oct. 29, 1975, Ser. No. 626,897
Int. Cl.[2] C08F 28/02; C08K 5/01, 5/54
U.S. Cl. 260—33.6 UA 12 Claims

1. A process for the in situ preparation of a vinylimidazoline polymer composition dispersed in an inert oil comprising:

a. reacting polyacrylonitrile with ethylene diamine in mol ratios of at least about 1:1 in a volatile solvent medium containing an organic or inorganic sulfide catalyst capable of generating at least trace amounts of hydrogen sulfide while retaining the reaction medium at a temperature between 40° C. and 100° C. and under a dry inert atmosphere to produce poly(vinylimidazoline) and continuously purging off the by-product gaseous ammonia; and

b. distilling off excess unreacted ethylene diamine and volatile solvent under reduced pressure while concurrently adding an inert oil in an amount sufficient to yield a dispersion in which the concentration is poly(vinylimidazoline) in oil of not greater than 65%.

4,041,007

EPOXY COMPOSITION AND ARTICLE OF MANUFACTURE THEREOF

William D. Waters, Tulsa, Okla., assignor to Youngstown Sheet and Tube Company, Youngstown, Ohio

Filed Mar. 5, 1976, Ser. No. 664,092
Int. Cl.[2] C08L 63/00
U.S. Cl. 260—37 EP 7 Claims

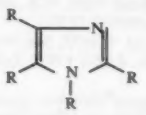
1. An epoxy composition which comprises,

an epoxy resin,

an aromatic amine and substantially the stoichiometric amounts sufficient to react with the epoxy groups in said epoxy resin,

a clay filler, and

a retarding agent having a composition as follows:



wherein R may be hydrogen or an organic radical,

said retarding agent being provided in an amount in the range from 0.06% to 3.30% by weight of the total composition and in the range from 0.2% to 12% by weight of the clay filler.

4,041,008

LOW SMOKE DENSITY FIRE-RETARDANT RESINS

Joseph M. Makhlouf, Mars, and Earl E. Parker, Allison Park, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed May 12, 1975, Ser. No. 576,915
Int. Cl.[2] C08K 3/22
U.S. Cl. 260—40 R 16 Claims

1. A curable aliphatic polyester resin, suitable for molding and laminating, being essentially free of aromatic constituents comprising a mixture of:

A. an unsaturated aliphatic polyester derived from polycondensing:

1. organic polyols having a functionality of at least 2,

2. organic polycarboxylic acids having a functionality of at least 2 in which the unsaturated component of the unsaturated polyester is an alpha, beta-ethylenically unsaturated polycarboxylic acid and the equivalent ratio of alpha, beta-ethylenically unsaturated polycarboxylic acid to all other polycarboxylic acid components in the polyester is at least 1 to 1; and

B. an aliphatic vinyl monomer which is a lower alkyl ester containing 1 to 4 carbon atoms of methacrylic or acrylic acid and which is copolymerizable with said polyester,

C. at least 50 percent by weight hydrated alumina, the percentage by weight being based on total weight of (A), (B) and (C),

said composition capable of being completely cured to produce strong thermoset articles of construction which, when burned, produce little smoke.

4,041,009
PROCESS FOR PRODUCING ANTI-BLOCKING AND LOW PRESSURE MOLDABLE DIALLYL PHTHALATE RESIN MOLDING MATERIALS

Shiroh Takeda, Sagamihara; Yuji Nagai, Komae, and Takenori Suzuki, Yokohama, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Dec. 8, 1976, Ser. No. 748,678
Int. Cl.² C08K 7/14
U.S. Cl. 260—42.18 **6 Claims**

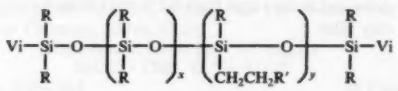
1. A process for the production of anti-blocking and low pressure moldable diallyl phthalate resin molding materials, wherein a mixture of 100 parts by weight of at least one diallyl phthalate resin prepolymer 50 to 150 parts by weight of glass fiber, 30 to 200 parts by weight of at least one finely divided inorganic filler, 0.1 to 1.0 part by weight of t-butylperoxy 2-ethylhexanoate and 1.5 to 4.0 parts by weight of at least one organic peroxide having a half life of 1 hour at a temperature within the range of from 120° to 150° C, is milled at a temperature of 40° to 100° C.

4,041,010
SOLVENT RESISTANT ROOM TEMPERATURE VULCANIZABLE SILICONE RUBBER COMPOSITIONS

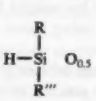
Edward M. Jeram, Burnt Hills, N.Y., assignor to General Electric Company, Waterford, N.Y.

Filed Oct. 6, 1975, Ser. No. 619,592
Int. Cl.² C08L 83/06; C08K 3/10; C08G 77/12
U.S. Cl. 260—42.26 **18 Claims**

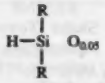
1. A solvent resistant room temperature vulcanizable silicone rubber composition comprising (A) 100 parts of a mixture composed of (i) 100 parts of a vinyl-containing polymer of the formula,



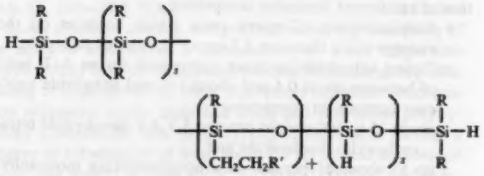
wherein Vi is vinyl, R is selected from the class consisting of alkyl radicals of 1 to 8 carbon atoms and phenyl, R′ is perfluoroalkyl of 1 to 8 carbon atoms, x and y are at least 1, and the viscosity of the compound varies from 1,000 to 100,000 centipoise at 25° C, and the concentration of siloxy units taken y times varies from 5 to 98 mole percent; (ii) from 1 to 60 parts of a vinyl-containing resin selected from the class consisting of a resin having $ViRR''SiO_{0.5}$ units and SiO_2 units where the hydrocarbon substituent to Si ratio varies from 0.8 to 2.7; a resin having $ViRR''SiO_{0.5}$ units, SiO_2 units and $RR''SiO$ units where the hydrocarbon substituent to Si ratio varies from 0.8 to 2.4 and a resin having $ViR_2SiO_{0.5}$ units, $R_2R''SiO_{0.5}$ units, SiO_2 units and $RR''SiO$ units where the hydrocarbon substituent to Si ratio varies from 0.8 to 2.4; a resin having $ViR_2SiO_{0.5}$ units, $R_2R''SiO_{0.5}$ units, SiO_2 units, $ViR''SiO$ units and $RR''SiO$ units where the hydrocarbon substituent to Si ratio varies from 0.8 to 2.4 and a resin having a $R_2R''SiO_5$ units, SiO_2 units and $ViR''SiO$ units where the hydrocarbon substituent to Si ratio varies from 0.8 to 2.4 where Vi and R are as previously defined, R″ is an $—CH_2CH_2R''$ radical, where R′ is as previously defined and the vinyl concentration of said resin must not differ more than 20 mole percent from the vinyl concentration of polymer (*i*); (iii) from 0.1 to 50 parts per million of the total composition of a platinum catalyst; and (B) from 1 to 50 parts based on 100 parts of the mixture (A) of a cross-linking polymer selected from the class consisting of (iv) a resin having



units and SiO_2 units where the R + H + R‴ to Si ratio varies from 1.0 to 2.7l; (v) a resin having



units, SiO_2 units and RR‴SiO units where the H + R + R‴ to Si ratio varies from 1.2 to 2.7 and (vi) a polymer of the formula,



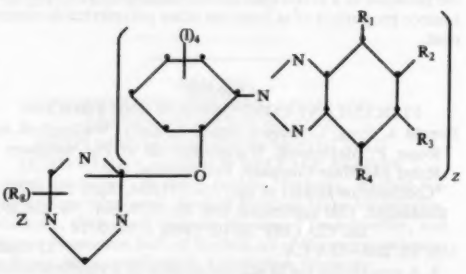
and mixtures thereof and where the concentration of the units taken t times varies from 0 to 75 mole percent, where R,R′ are as previously defined, s is at least 1, t and z may be zero or a positive integer and the viscosity of the polymer varies from 10 to 1,000 centipoise at 25° C, and R‴ is selected from the class consisting of alkyl radicals of 1 to 8 carbon atoms and $—CH_2CH_2R'$ radicals.

4,041,011
BENZOTRIAZOLE ORTHO-ESTER ULTRAVIOLET STABILIZERS

David Martin Pond, and Richard Hsu-Shien Wang, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 511,565, Oct. 2, 1974, Pat. No. 3,936,418.
This application Oct. 28, 1975, Ser. No. 626,520
Int. Cl.² C08K 5/34, 5/49
U.S. Cl. 260—45.8 NT **14 Claims**

1. An organic composition susceptible to ultraviolet degradation stabilized against such degradation with a stabilizing amount of a composition of matter having the following formula:



wherein Z is an integer 1, 2 or 3;

R_1, R_2, R_3 and R_4 are hydrogen, chloro, bromo lower alkyl, substituted lower alkyl, cycloalkyl, substituted cycloalkyl, aryl, substituted aryl, lower alkylaryl, alkoxy, amino, substituted amino, cyano, carboxy and the substituents R_1 and R_2, R_2 and R_3, R_3 and R_4, combined with the carbon atoms to which they are attached, are joined alkylene groups completing a carbocyclic ring, which ring can also be substituted with one or more of the substituents listed above for R_1, R_2, R_3 and R_4; R_8 may be halogen, hydroxy, halogen, C_1–C_{12} substituted or unsubstituted alkyl, amino,

alkylamino, dialkylamino, arylamino, dirarylamino, alkoxy, aryl, or aryloxy; and

I is the same as R_1, R_2, R_3 and R_4 and is present on all positions of the benzenoid ring, except the carbon atom attached to the carbonyl linking substituent, said I substituents can all be one of the substituents listed above or different listed substituents.

4,041,012

ACRYLATE ESTERS OF DIHALONEOPENTYL GLYCOL PHOSPHATES (PHOSPHORINANES) AND THEIR USE AS FLAME RETARDANTS

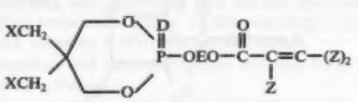
James A. Albright, and Michael W. Lindvay, both of Ann Arbor, Mich., assignors to Velsicol Chemical Corporation, Chicago, Ill.

Filed June 1, 1976, Ser. No. 691,533

Int. Cl.[2] C07F *9/06*; C08K *5/52*; C08L *37/00*

U.S. Cl. 260—45.8 A **14 Claims**

1. A compound of the formula



wherein each X is halogen, E is a lower alkylene group containing from about 2 to about 4 carbon atoms, D is chalcogen and each Z is independently selected from the group consisting of hydrogen and alkyl groups containing from about 1 to about 4 carbon atoms per group.

8. An acrylic polymeric composition comprising an acrylic polymer and a flame retarding amount of the compound of claim **1**.

4,041,013

PLASTIC COMPOSITIONS

Arnold L. Anderson, Alma, Mich., assignor to Velsicol Chemical Corporation, Chicago, Ill.

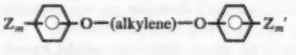
Filed Feb. 8, 1973, Ser. No. 330,796

The portion of the term of this patent subsequent to Aug. 9, 1994, has been disclaimed.

Int. Cl.[2] C08L *81/06*

U.S. Cl. 260—45.75 R **15 Claims**

1. A plastic composition consisting essentially of a polysulfone having incorporated therein an effective amount of bisphenoxy compound, which functions as a flame retardant for said composition, having the formula



wherein (a) Z is bromine; (b) *m* and *m'* are independent and are integers having a value of from 1 to 5; and (c) alkylene is a straight or branched chain alkylene group having from one to six carbon atoms.

4,041,014

NON-TOXIC STABILIZER FOR VINYL CHLORIDE RESINS

Gerry P. Mack, Jackson Heights, N.Y., assignor to M&T Chemicals Inc., Greenwich, Conn.

Continuation-in-part of Ser. No. 29,760, April 27, 1970, abandoned, which is a continuation of Ser. No. 694,868, Jan. 2, 1968, abandoned. This application July 30, 1973, Ser. No. 384,025

Int. Cl.[2] C08K *5/58*

U.S. Cl. 260—45.75 S **6 Claims**

1. A non-toxic stabilized polyvinyl chloride containing resin composition having desirable odor characteristics consisting essentially of a homopolymer or copolymer of at least one resin selected from the group consisting of polyvinyl chloride, vinyl chloride-vinyl acetate copolymers, vinyl chloride-fumaric acid copolymers, vinyl chloride-maleic acid copolymers, vinyl chloride-propylene copolymers, and vinyl chloride-ethylene copolymers, and containing between 1% and 3%, by weight based on the weight of polymer in said resin composition, of (A) a sulfur-containing stabilizer composition comprising between 94.8% and 98.2% by weight of di(n-octyl)tin S,S'bis-(isooctyl mercaptoacetate), between 1.8% and 5% of a total of (1) mono-n-octyltin S,S'S''-tris(isooctyl mercaptoacetate) and (2) tri (n-octyl)tin S-isooctyl mercaptoacetate, up to 1.5% of di(2-ethylhexyl)tin S,S'-bis(isooctyl mercaptoacetate), said sulfur-containing stabilizer composition containing between 15.1% and 16.4% of tin and between 8.1 and 8.9% of sulfur, and (B) a di)n-octyl)tin maleate polymer having the formula $[(n\text{—}C_8H_{17})_2SnC_4H_2O_4]_x$, wherein *x* is an integer selected from the group consisting of 2, 3, and 4, said maleate polymer having a melting point between about 93° C. and 97° C. and containing between 25.2 and 26.5% of tin; the weight ratio of said mercaptoacetate and said maleate being more than 2 parts by weight of said mercaptoacetate per part of said maleate up to a ratio of about 4:1.

4,041,015

MELT VISCOSITY STABILIZERS FOR VINYL CHLORIDE POLYMERS

William A. Larkin, Morristown, N.J., assignor to M&T Chemicals Inc., Greenwich, Conn.

Filed June 27, 1975, Ser. No. 591,109

Int. Cl.[2] C08K *3/30*

U.S. Cl. 260—45.75 R **3 Claims**

1. A method for stabilizing the melt viscosity of vinyl chloride polymer compositions said method consisting essentially of incorporating into said composition between 0.1 and 10%, based on the weight of the vinyl chloride polymer, of a linear polysulfide of the general formula $A_x(S_z)_y$ wherein each A is individually selected from the group consisting of elements exhibiting an atomic weight of between 6.9 and 209, inclusive and a valence *v*, the elements being in turn selected from groups I-A, I-B, II-A, II-B, III-A, IV-B, V-A, VI-B, VII-B and VIII of the periodic table, tin and lead, wherein *x* is 1 when *v* is even and *x* is 2 when *v* is odd, *y* is 1 when *v* is 1 or 2, *y* is 2 when *v* is 4 and *y* is equal to *v* when *v* is 3 or 5, and *z* is an integer between 3 and 8, inclusive.

4,041,016

FIRE RETARDANTS

David J. Fenoglio, Carol Stream, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed Jan. 17, 1974, Ser. No. 434,347

Int. Cl.[2] C08K *5/09*, *5/07*, *5/06*, *5/02*

U.S. Cl. 260—45.85 E **2 Claims**

1. A polyolefin composition having improved fire retardant properties comprising a polyolefin and a compound selected from the group consisting of 1,2,3,4-tetrahalonaphthobornadienes, 1,2,3,4,7,7-hexahalonaphthoboranadienes, 1,2,3,4-tetrahalo-7,7-dialkoxynaphthobornadienes, 1,2,3,4-tetrahalo-7-one-naphthobornadienes and 2,3,4-trihalo-9,10,4a,9a-tetrahydroanthracene-1-carboxylic acid wherein said compound is present in a concentration of 5 to 50 part by weight per 100 parts by weight polyolefin.

4,041,017
REACTIVE LIGHT-SENSITIVE HIGH POLYMER COMPOUND CONTAINING FURYL PENTADIENIC ESTER GROUPS AND INSOLUBILIZED BY ACTION OF HEAT, LIGHT OR ELECTRON BEAMS

Yukio Maekawa; Masato Satomura, and Akira Umehara, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

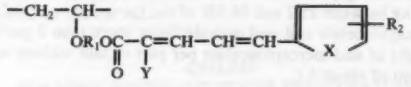
Division of Ser. No. 439,637, Feb. 4, 1974. This application June 13, 1975, Ser. No. 586,776

Claims priority, application Japan, Feb. 2, 1973, 48-13511; Feb. 2, 1973, 48-13513

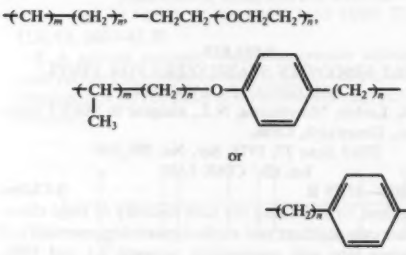
Int. Cl.[2] G03C *1/58*

U.S. Cl. 260—47 UA 12 Claims

1. A light-sensitive polymer comprising an organic solvent soluble homopolymer or copolymer of the monomer unit represented by the following formula:



wherein X represents O or S; Y represents H or CN; R_1 represents



R_2 represents H, C_nH_{2n+1}, Cl, Br, F or NO_2; *n* represents 1, 2, 3 or 4; and *m* represents 0 or 1.

4,041,018
THERMOPLASTIC CARBONATE-MODIFIED COPOLYESTERS AND A PROCESS FOR THEIR PREPARATION

Rudolf Binsack, Krefeld, and Hugo Vernaleken, Krefeld-Bockum, both of Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed July 18, 1975, Ser. No. 597,167

Claims priority, application Germany, July 24, 1974, 2435507

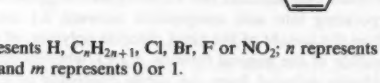
Int. Cl.[2] C08G *63/18, 63/62*

U.S. Cl. 260—75 R 4 Claims

1. A copolyester prepared by esterifying or transesterifying in the presence of an esterification or transesterification catalyst and at elevated temperature a mixture consisting essentially of substantially equal molar amounts of

a. an aromatic dicarboxylic acid or ester thereof and

b. a carbonic acid ester of the formula



wherein R is a divalent aliphatic radical with 2 to 10 carbon atoms and *n* is an integer from 0 to 2 and subsequently polycondensing resulting product in the presence of a polycondensation catalyst at a temperature of about 200 ° to 300° C. and under reduced pressure.

4,041,019
DELAYED-ACTION, HEAT ACTIVATED-URETHANE CATALYST

Philip W. McGraw, Angleton, Tex.; George A. Doorakian, Bedford, Mass., and Randall C. Rains, Denton, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Oct. 22, 1975, Ser. No. 624,698

Int. Cl.[2] C08G *18/20, 18/14*

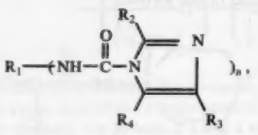
U.S. Cl. 260—75 NC 9 Claims

1. A composition comprising

a. an organic compound bearing at least one reactive isocyanato group;

b. an organic compound bearing active hydrogen; and

c. a small but sufficient amount of a catalyst to catalyze the reaction between the isocyanato group in (a) and the active hydrogen in (b); said catalyst corresponding to the formula



I

wherein: n is an integer of from 1 to 3;

R_1 is an n-valent organic radical

R_2 is hydrogen, hydrocarbyl or inertly-substituted hydrocarbyl;

R_3 and R_4 are each independently hydrogen, hydrocarbyl, inertly-substituted hydrocarbyl, or, R_3 and R_4 are joined to form a 5- or 6-membered carbocylic ring.

4,041,020
PROCESS FOR SPINNING ABSORBENT ARTICLES FROM COPOLYMERS HAVING A COPOLYMERIZED CROSSLINKER

James R. Gross, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 494,439, Aug. 5, 1974. This application Aug. 20, 1975, Ser. No. 606,372

Int. Cl.[2] C08F *28/00;* C08G *75/00*

U.S. Cl. 260—79.3 M 10 Claims

1. A method of preparing substantially dry water swellable polyelectrolyte fibers which comprises

1. preparing a, solution comprising

I. a solvent selected from the groups consisting of water, lower alcohols and mixtures thereof,

II. about 5 to about 60% by weight based on (I) of a crosslinkable carboxylic copolymer which contains in the copolymer

A. about 25 to about 98% by weight based on the total weight of the copolymer of units derived from an alkali metal salt of an olefinically unsaturated monosulfonic or monocarboxylic acid;

B. about 2 to about 50% by weight of units derived from an olefinically unsaturated monocarboxylic acid; and

C. about 0.1 to about 5.0% by weight of units derived from an N-substituted acrylamide or methacrylamide wherein the substituent group is a hydroxy methylene or an alkomethylene group having 1–8 carbons,

2. extruding said solution into a bath comprising lower alkyl ketones or chlorinated hydrocarbons to form extruded fiber,

3. separating the extruded fiber from said bath, and

4. heating said fibers to a temperature greater than about 30° C to crosslink said polyelectrolyte.

4,041,021

AP-GLYCOPROTEINS AND PROCESS FOR ISOLATING THEM

Hans Bohn, Marbach near Marburg an der Lahn, Germany, assignor to Behringwerke Aktiengesellschaft, Marburg an der Lahn, Germany

Continuation of Ser. No. 354,117, April 24, 1973, abandoned. This application July 1, 1975, Ser. No. 592,179

Claims priority, application Germany, Apr. 29, 1972, 2221261

Int. Cl.[2] C07G *7/00*

U.S. Cl. 260—112 B 5 Claims

1. A process for isolating alpha$_2$-AP-glycoprotein and beta$_1$-AP-glycoprotein from a protein solution containing the same which comprises:

a. adding diaminoethoxyacridine lactate to said protein solution at an alkaline pH in an amount from 10 to 30 percent by weight of the protein content of said solution, whereby a first precipitate forms;

b. recovering said first precipitate and dispersing it in aqueous sodium chloride, whereby a second precipitate forms;

c. separating and discarding said second precipitate and adding ammonium sulfate to the remaining supernatant liquid, whereby a third precipitate forms;

d. separating said third precipitate and dissolving it in an aqueous solution;

e. chromatographing said solution and collecting those fractions which contain the AP-glycoproteins;

f. adding ammonium sulfate to said fractions in an amount from 2 to 2.5 mols per liter, whereby a further precipitate forms in every fraction;

g. separating said further precipitates, dissolving them in water, and dialyzing the resulting solution against a buffer solution at a pH from 8.0 to 8.5;

h. subjecting the dialyzed solutions to zone electrophoresis and recovering the zone in the alpha$_2$ range, which contains the alpha$_2$-AP-glycoprotein, and the zone in the beta$_1$ range, which contains the beta$_1$-AP-glycoprotein.

4,041,022

PROCESS FOR THE MANUFACTURE OF THYROCALCITONIN

Robert Neher, Binningen, and Friedrich Werner Kahnt, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 98,153, Dec. 14, 1970, abandoned, which is a continuation-in-part of Ser. No. 728,897, May 14, 1968, abandoned. This application Aug. 15, 1975, Ser. No. 604,966

Claims priority, application Switzerland, May 24, 1967, 7346/67; July 12, 1967, 9950/67; Jan. 25, 1968, 1159/68

Int. Cl.[2] C07C *103/52*

U.S. Cl. 260—112.5 T 8 Claims

1. Process for the procurement of porcine thyrocalcitonin which comprises extracting defatted porcine thyroid gland tissue at least once with a solvent system comprising essentially water and a lower alkanol at a pH of about 1–6, and precipitating thyrocalcitonin from the extract(s) at least once with trichloracetic acid and subjecting the thus-obtained crude thyrocalcitonin to counter-current distribution in a solvent system containing n-butanol and water and gel chromatography on polyacryl amide having a fractionation range from molecular weights of 1000 – 5000 or to counter-current dialysis to yield the pure (1) thyrocalcitonin, (2) thyrocalcitonin-sulfoxide or (3) mixture of thyrocalcitonin and thyrocalcitonin-sulfoxide.

4,041,023

LABELLED PEPTIDES

Arthur Martin Felix, West Caldwell, and Arnold Alvin Liebman, Upper Saddle River, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Apr. 14, 1976, Ser. No. 676,969

Int. Cl.[2] C07C *103/52*

U.S. Cl. 260—112.5 R 18 Claims

1. An improved process for preparing a non-randomized deuterated or tritiated amino acid or peptide product which process comprises treating respectively an ethylenically unsaturated amino acid or a peptide analogous to said peptide product, said analogous peptide containing at least one ethylenically unsaturated amino acid with deuterium or tritium in the presence of palladium oxide catalyst.

4,041,024

SULFO CONTAINING MONOAZO DYESTUFFS CONTAINING A BENZTHIAZOLE DIAZO MOIETY AND AN N-BENZYLAMINO ANILINO COUPLING COMPONENT

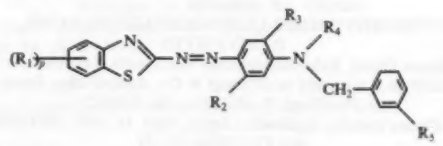
Gerhard Wolfrüm, Opladen, and Hans-Günter Otten, Cologne, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation of Ser. No. 33,516, April 30, 1970, abandoned. This application Oct. 3, 1972, Ser. No. 294,526

Int. Cl.[2] C09B *35/06, 35/22;* D06P *1/06, 3/24*

U.S. Cl. 260—158 1 Claim

1. Azo dyestuff of the formula



wherein

R_1 denotes hydrogen, C_1-C_4 alkyl, Cl, Br, —OCH_3, —OC_2H_5, —NO_2, —CN, —SCN, —SO_2CH_3, —$SO_2C_2H_5$, —SO_3H or —SO_2NX_2 with X being H or C_mH_{2m+1} and m representing a number from 1 to 4, or R_1 represents —$COOC_nH_{2n+1}$, with *n* representing a number from 0 to 4,

R_2 represents hydrogen, —CH_3, —C_2H_5, —OCH_3, —OC_2H_5, Cl, Br or —$NHCOC_nH_{2n+1}$, with *n* representing a number from 0 to 4,

R_3 denotes hydrogen or —OCH_3, —OC_2H_5, CH_3 or C_2H_5,

R_4 represents C_nH_{2n+1}, with *n* representing a number from 0 to 4, or R_4 represents —CH_2CH_2—SO_3H,

R_5 represents hydrogen or sulphonic acid and *p* is 1 or 2, with the proviso that the dyestuff contains only one sulphonic acid radical and one of R_1, R_4 and R_5 represents or contains the said sulphonic acid radical.

4,041,025

P-AMINOAZO DISPERSE DYES

Karl Maier; Guenter Hansen, both of Ludwigshafen, and Wolf-Dieter Kermer, Fussgoenheim, all of Germany, assignors to BASF Aktiengesellschaft, Germany

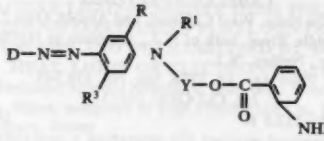
Filed Sept. 11, 1975, Ser. No. 612,352

Claims priority, application Germany, Sept. 27, 1974, 2446213

Int. Cl.[2] C09B *29/08, 29/26;* D06P *1/01, 3/54*

U.S. Cl. 260—158 9 Claims

1. A compound of the formula



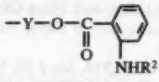
in which

D is thiadiazolyl substituted by methylmercapto, β-cyanoethylmercapto or β-C_1- to C_4-alkoxycarbonylmercapto; nitrothiazolyl; thienyl substituted by cyano, methyl, acetyl or C_1- to C_4-alkoxycarbonyl; or benzisothiazolyl substituted by chloro, bromo, cyano or nitro;

R is hydrogen, methoxy or ethoxy,

R^3 is hydrogen, methyl, chloro, acetylamino or propionylamino,

R^1 is hydrogen, C_1- to C_4-alkyl, β-cyanoethyl, β-hydroxyethyl or -propyl, β-C_1- to C_4-alkoxycarbonylethyl, β-C_1- to C_4-alkoxyethyl or -propyl, cyclohexyl, benzyl, phenylethyl, phenyl or



R^2 is hydrogen, C_1- to C_4-alkyl, β-chloroethyl or β-cyanoethyl and Y is $—CH_2CH_2—$, $—CH_2CH(CH_3)—$ or $—CH_2CH(C_2H_5)—$.

4,041,026

1,5-DIHYDRO-2H-1,4-BENZODIAZEPIN-2-ONE DERIVATIVES

Masaru Ogata, Kobe, and Hiroshi Matsumoto, Takatsuki, both of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

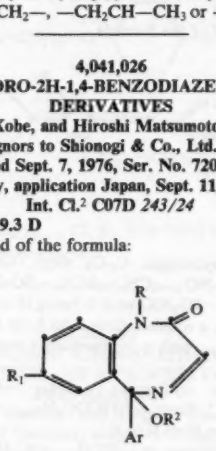
Filed Sept. 7, 1976, Ser. No. 720,832

Claims priority, application Japan, Sept. 11, 1975, 50-110753

Int. Cl.[2] C07D *243/24*

U.S. Cl. 260—239.3 D **5 Claims**

1. A compound of the formula:



wherein Ar represents pyridyl, phenyl, or halogenophenyl; R represents C_1 – C_6 alkyl; R^1 represents halogen, nitro, trifluoromethyl, or cyano; and R^2 represents C_1 – C_6 alkyl.

4,041,027

INSECTICIDAL OXIME DERIVATIVES

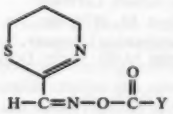
Steven A. Roman, Oakdale, Calif., assignor to Shell Oil Company, Houston, Tex.

Filed Aug. 23, 1976, Ser. No. 716,918

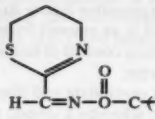
Int. Cl.[2] C07D *279/06*

U.S. Cl. 542—400 **1 Claim**

1. A compound of the formula



wherein Y is alkyl or alkoxy of from 1 to 20 carbon atoms; alkenyl, alkenyloxy or alkynyl of from 3 to 20 carbon atoms; cycloalkyl, alkylcycloalkyl or cycloalkylalkyl of from 3 to 10 carbon atoms, with from 3 to 6 carbon atoms in the ring; alkoxycarbonylalkyl of from 3 to 10 carbon atoms; alkylthioalkyl of from 2 to 10 carbon atoms; di(C_1-C_4 alkoxy)phosphinyloxy(C_2-C_6 alkenyl)-; styryl; mono(C_1-C_4 alkyl or alkoxy)phenyl; phenyl optionally substituted by from 1 to 3 of one or more of halogen, amino, mono- or di(C_1-C_4 alkyl)amino, nitro, cyano or phenoxy, heteroaryl selected from 2-furanyl, 2-thienyl, 2- and 3-pyridyl, and their corresponding phenylmethyl and heteroarylmethyl counterparts; or is



wherein n is 0, 1, 2, 3 or 4.

4,041,028

CHLORINATION OF 2,3-DIMETHYL-1,2,4-BENZOTHIA-DIAZINE 1,1-DIOXIDE

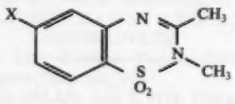
Gianluigi Soldati, Mercerville, N.J., assignor to Carter-Wallace, Inc., New York, N.Y.

Filed Apr. 24, 1975, Ser. No. 571,425

Int. Cl.[2] C07D *279/08*

U.S. Cl. 544—12 **1 Claim**

1. A process for preparing a compound selected from the group consisting of 2-methyl-3-trichloromethyl-1,2,4-benzothiadiazine-1,1-dioxide and 6-chloro-2-methyl-3-trichloromethyl-1,2,4-benzothiadiazine-1,1-dioxide which comprises dissolving a compound of the formula:



Wherein X is hydrogen or chlorine, in dimethylformamide and chlorinating with chlorine at 45°–80° C, and recovering the desired product.

4,041,029

ACYLIMINE CEPHALOSPORINS

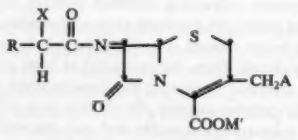
Raymond A. Firestone, Fanwood; Lovji D. Cama, Edison, and Burton G. Christensen, Metuchen, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 340,803, March 13, 1973, abandoned, which is a continuation-in-part of Ser. No. 203,056, Nov. 29, 1971, abandoned. This application Sept. 23, 1975, Ser. No. 615,856

Int. Cl.[2] C07D *501/16, 499/02, 501/04, 499/04*

U.S. Cl. 544—25 **5 Claims**

1. The compound



wherein

R is phenyl or a 5-membered heterocyclic ring having one O or one S hetero atom;

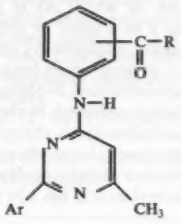
X is hydrogen, amino, or carboxyl;
M' is benzyl, benzhydryl, trimethylsilyl, trichloroethyl, methoxymethyl, benzoylmethyl, or methoxybenxzyl; and
A is hydrogen, loweralkanoyloxy, carbamoyloxy, thiocarbamoyloxy, N-loweralkylcarbamoyloxy, N-loweralkylthiocarbamoyloxy, N,N-diloweralkylcarbamoyloxy, N,N-diloweralkylthiocarbamoyloxy, pyridinium, alkylpyridinium, halopyridinium, or aminopyridinium.

4,041,030
ARYLAMINO PYRIMIDINIC DERIVATIVES

Claude P. Fauran, Paris; Guy R. Bourgery, Colombes; Guy M. Raynaud, Paris, and Claude J. Gouret, Meudon, all of France, assignors to Delalande S.A., Courbevoie, France

Continuation-in-part of Ser. No. 502,285, Sept. 3, 1974, Pat. No. 3,978,055. This application Aug. 16, 1976, Ser. No. 714,473
Claims priority, application France, Sept. 20, 1973, 73.338310; Mar. 26, 1974, 74.10327; July 7, 1976, 76.20775
Int. Cl.[2] C07D *413/12*
U.S. Cl. 544—117 **13 Claims**

1. A compound having the formula

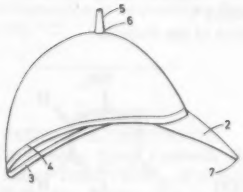


in which
a. Ar is p-chlorophenyl and R is morpholino or piperidino, or
b. Ar is o-chlorophenyl and R is morpholino, or
c. Ar is m-fluorophenyl and R is piperidino, or
d. Ar is 3,4-methylenedioxyphenyl and R is morpholino or amino, or
e. Ar is 3,4,5-trimethoxyphenyl and R is morpholino or amino.

4,041,031
METHOD OF MAKING FIBER REINFORCED PROTECTIVE HEADGEAR

Peter John Robert Heasman, Hale, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Dec. 6, 1974, Ser. No. 530,486
Claims priority, application United Kingdom, Dec. 20, 1973, 59055/73; Dec. 20, 1973, 59057/73
Int. Cl.[2] B29D *3/02*; B29F *1/00*
U.S. Cl. 264—250 **10 Claims**



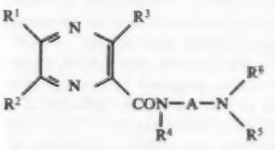
1. A method of making a shell for an article of protective headgear having a peak of a flexible thermoplastic organic polymeric material and a crown portion moulded thereto, said crown portion comprising a thermoplastic organic polymeric material reinforced with 10 to 40% by weight of a fibrous material wherein the fibres have an average length of at least 5 mm, comprising injecting in a molten state the crown material comprising the thermoplastic organic polymeric material containing the fibrous material into a mould cavity having a part defining the crown portion and a part defining the peak portion of the shell to contact and fuse with an earlier formed peak, situated in the part of the mould cavity defining the peak portion of the shell and formed from a peak material comprising the flexible thermoplastic organic polymeric material, said peak material having a melting point below the temperature at which the crown material is injected into the mould cavity, and cooling the resultant moulding to solidify the plastics materials, the polymers of said crown and peak portions being bondable to each other.

4,041,032
PYRAZINE DERIVATIVES

Masuo Murakami; Kozo Takahashi, both of Tokyo; Yasuhumi Hirata, Ageo; Mutsuo Takashima, Kawagoe; Masaaki Takeda, Urawa; Hiroyoshi Ino, and Sumio Iwanami, both of Ageo, all of Japan, assignors to Yamanouchi Pharmaceutical Co., Ltd., Tokyo, Japan

Filed Dec. 19, 1974, Ser. No. 534,636
Claims priority, application Japan, Jan. 16, 1974, 49-7726; Apr. 16, 1974, 49-43027
Int. Cl.[2] C07D *241/28*
U.S. Cl. 260—250 BN **6 Claims**

1. A pyrazine derivative represented by the formula



wherein R^1 and R^2, which may be the same or different, each represents a member selected from the group consisting of a hydrogen atom, a halogen atom, a hydroxy group, a C_{1-4} alkoxy group, a phenyl C_{1-4} alkoxy group, a phenoxy group, a mercapto group, a C_{1-4} alkylthio group, a phenyl C_{1-4} alkylthio group, a phenylthio group, an amino group, a substituted amino group selected from the group consisting of mono C_{1-4} alkylamino, di C_{1-4} alkylamino, hydroxy C_{1-4} alkylamino, di C_{1-4} alkylamino C_{1-4} alkylamino, C_{5-6} cycloalkylamino, C_{2-4} alkenylamino, phenylamino, C_{1-4} alkanoylamino, phenyl C_{1-4} alkylamino, benzoylamino, pyrrolidino, piperidino, morpholino, piperazino and 4-C_{1-4} alkylpiperazino, a C_{1-4} alkyl group, a carbamoyl group, and a sulfamoyl group, R^3 represents a C_{1-4} alkoxy group; R^4, R^5, and R^6, which may be the same or different, each represents a member selected from the group consisting of a hydrogen atom, a C_{1-4} alkyl group, a C_{3-6} cycloalkyl group, a phenyl C_{1-4} alkyl group, and a phenyl group; and A repreents a C_{1-4} alkylene group; said R^4 and A, R^5 and A, R^4 and R^5, or R^5 and R^6 may form together with the nitrogen atom a pyrrolidine, piperidine, piperazine, morpholine and imidazolidine ring and the pharmacologically acceptable non-toxic acid addition salts thereof.

4,041,033

NOVEL DERIVATIVES OF PYRIDAZINE-2-OXIDE

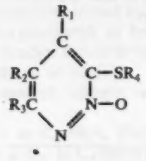
Miriam L. Douglass, Piscataway, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Division of Ser. No. 444,597, Feb. 21, 1974, Pat. No. 3,966,928, which is a continuation of Ser. No. 207,536, Dec. 13, 1971, abandoned. This application Feb. 17, 1976, Ser. No. 658,570

Int. Cl.[2] C07D *237/20*

U.S. Cl. 260—250 A **3 Claims**

1. A 3-mercaptopyridazine-2-oxide compound having the following structural formula:



wherein R_1, R_2, R_3 are each independently selected from the group consisting of hydrogen, straight and branched chain alkyl group; R_4 is $C(NH_2)_2X$ where X is a negatively charged group.

4,041,034

HEAT-CONVERTIBLE REACTION PRODUCTS OF EQUAL MOL RATIOS OF S-DIPHENYLCARBAZIDE AND AN AROMATIC DIANHYDRIDE

Eli Simon, 7175 Little Harbor Drive, Huntington Beach, Calif. 92648

Filed July 19, 1976, Ser. No. 706,477

Int. Cl.[2] C07D *237/32*; C08G *73/10*; C07G *73/00*

U.S. Cl. 260—250 P **2 Claims**

1. Heat-convertible, solvent-soluble, intermediate products of equal mol ratios of s-diphenylcarbazide and an aromatic dianhydride selected from pyromellitic dianhydride, 3,3′,4,4′-benzophenonetetracarboxylic dianhydride, and 1,4,5,8,-naphthalenetetracarboxylic dianhydride, prepared by reaction in a mutual solvent medium such as 1-methyl-2-pyrrolidinone at a temperature greater than 150° C. and less than 200° C., for thin film applications to metallic and non-metallic substrates at conversion temperatures in excess of 250° C., and preferably between 300° to 400° C.

4,041,035

1-BENZYL-1,2-DIHYDRO-3-METHYL-2-OXOPYRIMIDINIUM IODIDE

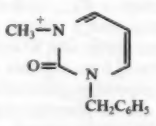
Thomas J. Schwan, Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed June 8, 1976, Ser. No. 693,934

Int. Cl.[2] C07D *239/22*

U.S. Cl. 260—251 R **1 Claim**

1. A compound of the formula:



4,041,036

WATER-INSOLUBLE COLORANTS, PROCESS FOR PREPARING THEM AND THEIR USE

Klaus Hunger, Kelkheim, Taunus, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

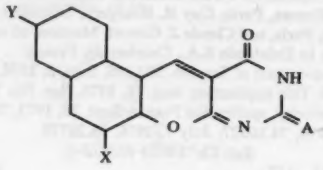
Filed Apr. 14, 1976, Ser. No. 676,925

Claims priority, application Germany, Apr. 16, 1975, 2516700

Int. Cl.[2] C07D *491/22*

U.S. Cl. 260—256.4 F **9 Claims**

1. A compound of the formula



in which A is oxygen, sulfur or imino, Y is hydrogen, chlorine, bromine or methoxy and X is carboxy or a group of the formula —CO—NH—Ar, in which Ar is naphthyl; phenyl; phenyl substituted by 1 to 3 equal or different substituents selected from alkyl, alkoxy, alkylsulfonyl, carboalkoxy, trifluoromethyl, nitro, cyano, alkanoylamino, benzoylamino, carbamoyl mono- or di-N alkyl-carbamoyl, N-phenylcarbamoyl, sulfamoyl, mono- or di-N-alkyl-sulfamoyl, N-phenyl sulfamoyl and halogen; or Ar is benzimidazolonyl, chlorobenzimidazolonyl, tetrahydro-quinazoline-dionyl, tetrahydro-quinoxaline-dionyl, phthalimidyl or tetrahydro-phthalazine-dionyl; wherein each alkyl, alkoxy and alkanoyl moiety has 1 to 4 carbon atoms.

4,041,037

ANTITUMOR DERIVATIVES OF PERIODATE-OXIDIZED CYTIDINE

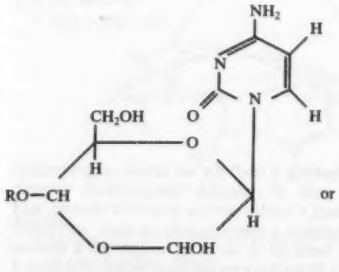
William Dvonch, Radnor, and Harvey E. Alburn, West Chester, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 585,646, June 10, 1975, Pat. No. 4,000,137. This application June 21, 1976, Ser. No. 697,881

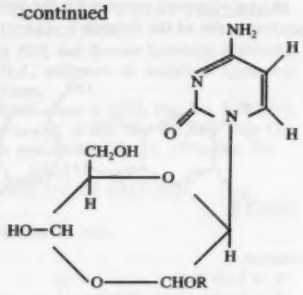
Int. Cl.[2] C07D *405/04*

U.S. Cl. 260—256.4 C **3 Claims**

1. A compound of the formula



-continued



wherein R is methyl or ethyl.

4,041,038

1-(3-PHENYLPROPYL)-4-(BETA-ALKOXYACRYLOYL)-PIPERAZINE DERIVATIVES

Tsutomu Irikura, Tokyo, Japan, assignor to Kyorin Pharmaceutical Co., Ltd., Tokyo, Japan

Filed Feb. 11, 1976, Ser. No. 657,278

Claims priority, application Japan, Dec. 26, 1975, 50-155133; May 27, 1975, 50-62551

Int. Cl.[2] C07D *295/10, 241/06*

U.S. Cl. 260—268 C **19 Claims**

1. The compound of trans-1-(3-Phenylpropyl)-2,5-dimethyl-4-(*β*-ethoxyacryloyl)piperazine

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4,041,039

PROCESS FOR PREPARING 2-ETHYL-PYRIDINE

Hans-Jürgen Arpe, Fischbach, Taunus, and Hansjörg Hey, Langenhain, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Division of Ser. No. 476,992, June 6, 1974, Pat. No. 3,957,792. This application Feb. 17, 1976, Ser. No. 658,571

Claims priority, application Germany, June 8, 1973, 2329389

Int. Cl.[2] C07D *213/06*

U.S. Cl. 260—290 R **16 Claims**

1. A process for the preparation of 2-ethyl-pyridine which comprises reacting 2-methyl-pyridine and methanol in the gaseous state at a reaction temperature in the range of about 200° C to about 600° C. in the presence of a catalyst composition consisting essentially of silicon dioxide and (a) an oxide of bismuth, (b) oxides of bismuth and antimony, (c) oxides of bismuth, antimony and an element of the lanthanide series of the Periodic System or a mixture thereof, or (d) oxides of antimony and an element of the lanthanide series of the Periodic System or a mixture thereof, to form 2-ethyl-pyridine, which catalyst composition is activated by heating to about 150° C. to about 850° C.

4,041,040

ECGONINE DERIVATIVE

James Gordon Christenson, North Caldwell; Harvey Gurien, Irvington, and Sidney Teitel, Clifton, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Sept. 22, 1976, Ser. No. 725,913

Int. Cl.[2] C07D *471/08*

U.S. Cl. 260—292 **5 Claims**

1. Ecgonine methyl ester (p-lower alkanoyloxy) benzoate and acid addition salts thereof.

3. 4-Hydroxybenzoyl ecgonine and acid addition salts thereof.

4,041,041

ACETYLENE DERIVATIVES OF AMINO ACIDS

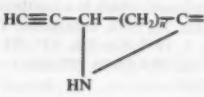
Brian Walter Metcalf, Strasbourg, and Michel Jung, Illkirch, both of France, assignors to Merrell Toraude et Compagnie, Strasbourg, France

Division of Ser. No. 559,547, March 18, 1975, Pat. No. 3,959,356. This application Mar. 8, 1976, Ser. No. 664,516

Int. Cl.[2] C07D *211/76, 207/26;* **C07C** *103/183* **C07D** *103/28*

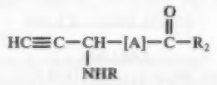
U.S. Cl. 260—293.86 **6 Claims**

1. A compound of the formula

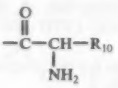


wherein *n'* is the integer 2 or 3; or a pharmaceutically useful salt and individual optical isomers thereof.

2. A compound of the formula:



wherein R is hydrogen, alkylcarbonyl wherein the alkyl moiety contains from 1 to 4 carbon atoms, or



wherein R_{10} is hydrogen, a straight or branched lower alkyl group of from 1 to 4 carbon atoms, benzyl or *p*-hydroxybenzyl; R_2 is a lower alkylamino group wherein the alkyl moiety has from 1 to 4 carbon atoms; [A] is —CH=CH— or

wherein R_1 is hydrogen, lower alkyl of from 1 to 4 carbon atoms, phenyl or substituted phenyl wherein the substituents on the substituted phenyl may be attached at the ortho, meta or para positions of the phenyl ring and are halogen, lower alkoxy of from 1 to 4 carbon atoms or lower alkyl of from 1 to 4 carbon atoms; *n* is an interger of from 1 to 5; and the lactams of said compounds wherein [A] represents

wherein R_1 represents hydrogen, and *n* is the integer 2 or 3; or a pharmaceutically acceptable salt and individual optical isomers thereof.

4,041,042

INTERMEDIATE COMPOSITION

Arthur C. Fabian, Flanders; Jerome D. Genzer, Livingston; Charles Francis Kasulanis, Hopatcong; John Shavel, Jr., Mendham, and Harold Zinnes, Rockaway, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 577,568, May 21, 1975, Pat. No. 3,957,772. This application Dec. 29, 1975, Ser. No. 645,058

Int. Cl.[2] C07D *275/06*

U.S. Cl. 260—301 **2 Claims**

1. A composition comprising a reaction mixture containing approximately equimolar quantities of a salt of saccharin per

mole of 3-(haloacetamido)-5-methylisoxazole in N,N'-dimethylformamide.

4,041,043
PARTICULARLY SUBSTITUTED THIAZOLESULFENAMIDES

Marion J. Gattuso, Hoffman Estates, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 399,213, Sept. 20, 1973, abandoned, which is a continuation-in-part of Ser. No. 139,145, April 30, 1971, abandoned, which is a continuation-in-part of Ser. No. 100,508, Dec. 21, 1970, abandoned. This application Dec. 5, 1975, Ser. No. 637,994
Int. Cl.² C07D *277/80*
U.S. Cl. 260—306.6 A **2 Claims**

1. An N-phenyl-N-alkyl-benzothiazole-2-sulfenamide in which the sulfenamide is N-phenyl-N-sec-octylbenzothiazole-2-sulfenamide.

2. An N-phenyl-N-alkyl-benzothiazole-2-sulfenamide in which the sulfenamide is N-phenyl-N-dodecylbenzothiazole-2-sulfenamide.

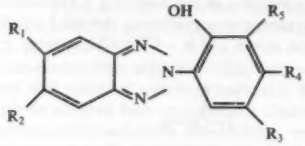
4,041,044
PROCESS FOR THE PRODUCTION OF 2-ARYL-2H-BENZOTRIAZOLES

Howard L. White, Warwick, R.I., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

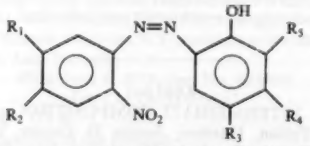
Continuation-in-part of Ser. No. 527,179, Nov. 25, 1974, abandoned. This application Oct. 15, 1975, Ser. No. 622,572
Int. Cl.² C07D *249/20*
U.S. Cl. 260—308 B **16 Claims**

1. An improved process for the production of 2-aryl-2H-benzotriazoles of the formula I

(I)



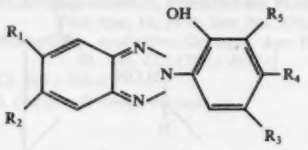
wherein
R_1 is hydrogen,
R_2 is hydrogen or chlorine,
R_3 is methyl, sec-butyl, tert-butyl, tert-amyl, tert-octyl, cyclohexyl, chlorine or carboxyethyl,
R_4 is hydrogen, and
R_5 is chlorine, methyl, tert-butyl, sec-butyl, tert-amyl, tert-octyl or α-methylbenzyl
by the reduction at a temperature between about 55° to about 73° C of the corresponding o-nitroazobenzene intermediate



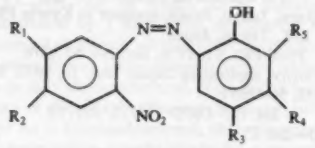
by adding zinc to an aqueous alkali metal hydroxide medium containing said o-nitroazobenzene intermediate wherein the improvement comprises
employing an initial ratio of moles of alkali to moles of o-nitroazobenzene intermediate in the range of 0.2 to 0.848/1 in the presence of an amount of iron impurities in the reaction system of less than 150 ppm based on zinc used, and with no additional alkali or o-nitroazobenzene being added during the reduction reaction.

10. An improved process for the production of 2-aryl-2H-benzotriazoles of the formula I

(I)



wherein
R_1 is hydrogen,
R_2 is hydrogen or chlorine,
R_3 is metyl, sec-butyl, tert-butyl, tert-amyl, tert-octyl, cyclohexyl, chlorine or carboxyethyl,
R_4 is hydrogen, and
R_5 is hydrogen
by the reduction at a temperature between about 45° and 75° C of the corresponding o-nitroazobenzene intermediate



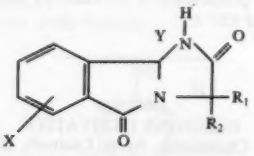
by adding zinc to an aqueous alkali metal hydroxide medium containing said o-nitroazobenzene intermediate wherein the improvement comprises
employing an initial ratio of moles of alkali to moles of o-nitroazobenzene intermediate in the range of 1.2 to 1.7/1 in the presence of an amount of iron impurities in the reaction system of less than 150 ppm based on zinc used, and with no additional alkali or o-nitroazobenzene being added during the reduction reaction.

4,041,045
DIHYDROIMIDAZ OISOINDOLEDIONES AND THE USE THEREOF AS HERBICIDAL AGENTS

Marinus Los, Pennington, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Nov. 12, 1975, Ser. No. 631,356
Int. Cl.² C07D *235/02*
U.S. Cl. 548—302 **10 Claims**

1. A compound having the formula:



wherein X is H, CH_3, NO_2, Cl, OCH_3 or SCH_3; R_1 is alkyl C_1–C_4; R_2 is alkyl C_1–C_6, cycloalkyl C_3–C_6, alkenyl C_2–C_4, phenyl, halophenyl or benzyl; and when R_1 and R_2 are taken together with the carbon to which they are attached they may form cycloalkyl C_3–C_6 optionally substituted with methyl; Y is hydrogen, —NR_3R_4, —OR_5 or —SR_6; R_3, R_4, R_5 and R_6 are each hydrogen or alkyl C_1–C_4; and the optical and stereo isomers thereof.

4,041,046
1,2-DIALKYL-3,4,5-TRISUBSTITUTED PYRAZOLE COMPOUNDS

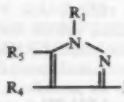
Barrington Cross, Rocky Hill, and Bryant Leonidas Walworth, Pennington, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 584,686, June 6, 1975, Pat. No. 3,963,742, which is a continuation-in-part of Ser. No. 487,826, July 12, 1974, abandoned. This application Feb. 11, 1976, Ser. No. 657,113

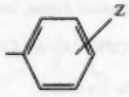
Int. Cl.[2] **C07D** *231/12;* **A01N** *9/22*

U.S. Cl. 548—375 **9 Claims**

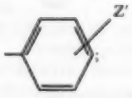
1. A compound having the formula:



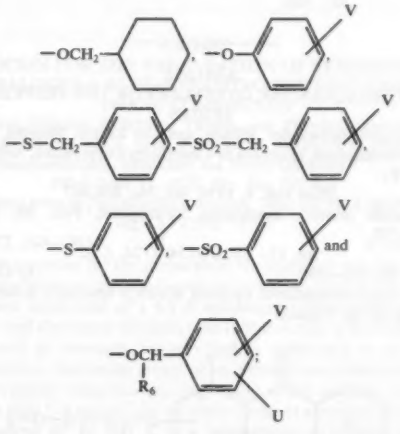
wherein R_1 represents a member selected from the group consisting of hydrogen, alkyl C_1–C_5, allyl and benzyl; R_3 represents a member selected from the group consisting of



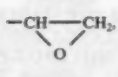
and naphthyl; R_5 is



R_4 represents a member selected from the group consisting of alkoxy C_2–C_{22}, alkenyloxy C_3–C_4, halogen substituted alkenyloxy C_3–C_4, alkynyloxy C_3–C_4, —O—$(CH_2)_n$—W, alkylthio C_1–C_{22}, alkylsulfonyl C_1–C_{22},



R_6 represents a member selected from the group consisting of hydrogen, methyl and phenyl; U and V each represent members selected from the group consisting of hydrogen, halogen, alkyl C_1–C_4, alkoxy C_1–C_4, NO_2 and CF_3; W represents a member selected from the group consisting of halogen, cyano, carbalkoxy C_1–C_7,



alkoxy C_1–C_7, alkylthio C_1–C_7, alkylsulfonyl C_1–C_7, benzylthio and benzylsulfonyl; Z and Z′ each represent members selected from the group consisting of hydrogen, halogen, alkyl C_1–C_{12}, alkoxy C_1–C_4 and phenyl with the proviso that when R_1 is ethyl, R_4 cannot be ethoxy; *n* represents an integer selected from 1,2,3 and 4.

4,041,047
9-THIAPROSTAGLANDINS

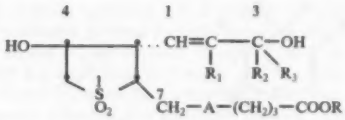
Isidoros Vlattas, Summit, N.J., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 516,293, Oct. 21, 1974, Pat. No. 3,970,670, which is a continuation-in-part of Ser. No. 460,837, April 15, 1974, abandoned, which is a continuation-in-part of Ser. No. 361,752, May 18, 1973, Pat. No. 3,881,017. This application Oct. 14, 1975, Ser. No. 621,901

Int. Cl.[2] **C07D** *333/48*

U.S. Cl. 260—332.1 **7 Claims**

1. A 7-[3-hydroxy-3-hydrocarbylpropyl or -1-propenor ynyl)-4-hyroxy-tetrahydro-2β-thienyl]-alkanoic or 5-alkenoic acid of the formula



wherein R is hydrogen, an alkali metal, one equivalent of an alkaline earth metal, ammonium, mono-, di- or tri-lower alkylammonium, alkyl with up to 12 carbon atoms, lower alkenyl, lower alkynyl, Ph or Ph-C_nH_{2n}, wherein Ph is phenyl, (lower alkyl)-phenyl, (halogeno)-phenyl or (trifluoromethyl)-phenyl, and *n* is an integer from 1 to 4, A is ethylene or ethenylene, each of R_1 and R_2 is hydrogen or lower alkyl and R_3 is alkyl with up to 12 carbon atoms, lower alkenyl or lower alkynyl, or the 1,2-dihydroderivatives or 1,2-dehydro-derivatives thereof.

4,041,048
2,2-BENZOXAZEPINE DERIVATIVES

Giorgio Pifferi, Milan; Amedeo Omodei-Salè, Pavia, and Pietro Consonni, Milan, all of Italy, assignors to Gruppo Lepetit S.p.A., Milan, Italy

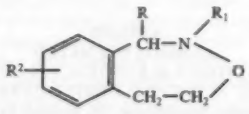
Continuation-in-part of Ser. No. 234,336, March 13, 1972, abandoned. This application Nov. 14, 1974, Ser. No. 523,790

Claims priority, application Italy, Mar. 18, 1971, 21930/71; Jan. 20, 1972, 19575/72

Int. Cl.[2] **C07D** *267/02*

U.S. Cl. 260—333 **7 Claims**

1. A benzoxazepine compound represented by the formula



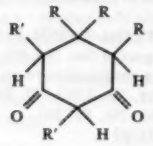
wherein R represents hydrogen or lower alkyl, R^1 represents a member of the group consisting of hydrogen; lower alkyl; lower alkenyl; and hydroxy lower alkyl; and R^2 may be in position 7 or 8 of the benzoxazepine ring and represents hydrogen, nitro, amino, acetamino or halo.

4,041,049
PROCESS FOR THE MANUFACTURE OF CYCLOHEXANE-1,3-DIONES AND 6-ALKYL-3,4-DIHYDRO-2-PYRANONES

Werner Heinrich Müller, Kelkheim, Taunus; Hansjörg Hey, Hofheim, Taunus, and Helmut Meidert, Frankfurt am Main, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

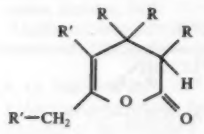
Filed Oct. 10, 1975, Ser. No. 621,584
Claims priority, application Germany, Oct. 12, 1974, 2448677
Int. Cl.[2] C07C *45/00, 45/18;* C07D *309/30*
U.S. Cl. 260—343.5 3 Claims

1. A process for the manufacture of cyclohexane-1,3-diones of the formula I



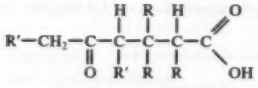
(I)

having up to 24 carbon atoms in admixture with 6-alkyl-3,4-dihydro-2-pyranones of the formula II



(II)

having up to 24 carbon atoms, in which formulae the radicals R and R′ may be identical or different and each represent a hydrogen atom, an alkyl, a cycloalkyl or an aryl group each having up to 12 carbon atoms and the two radicals R′ together optionally represent a —$(CH_2)_3$-group, which comprises passing 4-oxocarboxylic acids of the formula III



(III)

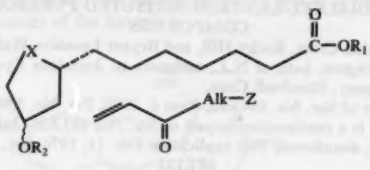
having up to 24 carbon atoms and in which R and R′ have the above meaning at a temperature of from 250° to 500° C in the gaseous phase over a dehydration catalyst.

4,041,050
3,5-BISOXYGENATED 2-(ω-HALO-3-OXO-1-ALKENYL)-CYCLOPENTANE-1-HEPTANOIC ACIDS AND DERIVATIVES THEREOF

Richard A. Mueller, Northbrook, Ill., assignor to G. D. Searle & Co., Chicago, Ill.

Continuation-in-part of Ser. No. 577,675, May 15, 1975, Pat. No. 3,997,588. This application Sept. 20, 1976, Ser. No. 724,500
Int. Cl.[2] C07C *177/00*
U.S. Cl. 260—345.7 7 Claims

1. A compound of the formula



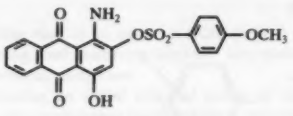
wherein R_1 is hydrogen or an alkyl radical containing 1–12 carbon atoms; R_2 is hydrogen, a tetrahydropyran-2-yl or trialkylsilyl radical, or alkanoyl radical containing 1–12 carbon atoms; X is a carbonyl or hydroxymethylene radical; Z is a chloro, bromo, or iodo radical; Alk is an alkylene radical containing 3–8 carbon atoms; and the wavy lines represent the alternative α and β stereochemical configurations.

4,041,051
ANTHRAQUINONE DISPERSE DYESTUFFS

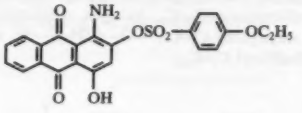
Eiji Yamada, Takatsuki; Hiroaki Ito, Toyonaka, and Takashi Akamatsu, Ashiya, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Aug. 2, 1966, Ser. No. 569,586
Claims priority, application Japan, June 28, 1966, 41-42537; Aug. 4, 1965, 40-47371
Int. Cl.[2] C07C *143/68;* C09B *1/52*
U.S. Cl. 260—373 2 Claims

1. A compound of the formula,



2. A compound of the formula,

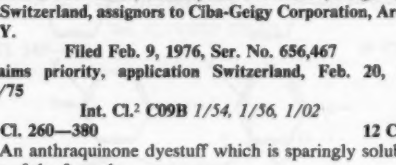


4,041,052
ANTHRAQUINONE DYESTUFFS OF THE DISPERSE SERIES

Hansrudolf Schwander, Riehen, and Urs Karlen, Magden, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Feb. 9, 1976, Ser. No. 656,467
Claims priority, application Switzerland, Feb. 20, 1975, 2153/75
Int. Cl.[2] C09B *1/54, 1/56, 1/02*
U.S. Cl. 260—380 12 Claims

1. An anthraquinone dyestuff which is sparingly soluble in water of the formula



wherein Y is amino, alkylated amino or hydroxyl, the ring A can be substituted by halogen, methyl, ethyl, methoxy, ethoxy, nitro or acylamino, Z is C_1–C_4-alkylcarbonyl, C_1–C_4-

alkylaminocarbonyl, C_1–C_4-alkyloxycarbonyl, —CHO or hydrogen, and one of R_1 and R_2 is hydrogen and the other is C_1–C_8-alkyl, C_1–C_8-alkyl substituted by cyclohexyl, cyclopentyl, phenyl, nitrophenyl, C_1–C_2-alkoxyphenyl, chlorophenyl, C_1–C_2-alkylphenyl, bromophenyl, fluorophenyl, cyano, chlorine or bromine, cycloalkyl, or aryl or substituted aryl or a carboxy ester group.

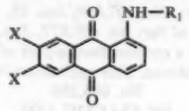
4,041,053

PROCESS FOR THE PREPARATION OF ANTHRAQUINONE COMPOUNDS

Helmut Herzog, Leverkusen; Hans-Samuel Bien, Burscheid, and Walter Hohmann, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Mar. 24, 1976, Ser. No. 669,893
Claims priority, application Germany, Mar. 29, 1975, 2513950
Int. Cl.² C09B *1/16*
U.S. Cl. 260—381 **5 Claims**

1. Anthraquinone compounds of the formula



as well as their mixtures,

wherein R_1 represents cyclopentyl, cycloheptyl, cyclohexyl, methylcyclohexyl, dimethylcyclohexyl, trimethylcyclohexyl, chlorocyclohexyl, benzyl, α-phenylethyl, β-phenylethyl, chlorobenzyl, methylbenzyl or methoxybenzyl; and one X represents chlorine and the other X represents hydrogen.

4,041,054

PROCESS FOR THE PREPARATION OF SYMMETRIC 4-HALOGEN-4′,4″-DIARYLAMINO-TRIPHENYLMETHANE COMPOUNDS

Manfred Hähnke, Kelkheim, Taunus, and Theodor Papenfuhs, Frankfurt am Main, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed June 17, 1975, Ser. No. 587,413
Claims priority, application Germany, June 20, 1974, 2429673
Int. Cl.² C09B *11/10*
U.S. Cl. 260—393 **6 Claims**

1. In a process for the preparation of symmetric 4-halogeno-4′,4″-diarylamino-triphenyl-methane compounds by reacting a complex compound of a 4,4′,4″-trihalogeno-triphenylmethyl-halide and aluminum chloride, iron-(III) chloride or bortrifluoride with an aromatic amine which is substituted in m- or p-position to the amino group, at an elevated temperature, the improvement comprises reacting 1 mol of the complex compound with 5–8 mols of the aromatic amine at a temperature of from about 80° to 100° C in a halobenzene as solvent, and subsequently converting the so obtained complex compound from 4-halogeno-4′,4″-diarylamino-triphenyl-methyl-halide and aluminum chloride, iron-(III) chloride or bortrifluoride first into the anhydro- or carbinol base of the dyestuff with the aid of an aqueous alkali metal hydroxide solution and then precipitating the salt of the dyestuff by addition of an acid in excess.

4,041,055

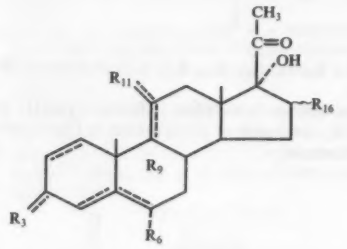
PROCESS FOR THE PREPARATION OF 17α-HYDROXYPROGESTERONES AND CORTICOIDS FROM ANDROSTENES

Kenneth Paul Shephard, and Verlan H. Van Rheenen, both of Portage, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed Nov. 17, 1975, Ser. No. 632,671
Int. Cl.² C07J *5/00, 7/00*
U.S. Cl. 260—397.3 **92 Claims**

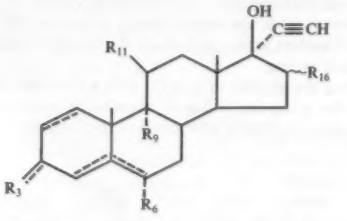
1. A process for the preparation of a steriod of the formula

X



where R_3 is an oxygen atom (O) or a hydroxyl group (HO) with the proviso that when R_3 is (O) there are double bonds between C_3 and R_3 and between C_4 and C_5, and when R_3 is (HO) there is a single bond between C_3 and R_3 a double bond between C_5 and C_6; where R_6 is a hydrogen or fluorine atom or methyl group; where R_9 is a hydrogen, fluorine, chlorine, or bromine atom, or hydroxyl group; where R_{11} is (H), (H,H), (H,αOH), (H,βOH) or (O); where R_{16} is a hydrogen atom or methyl group; where ~ indicates the attachment of the R_{16} group in the alpha or beta configuration; and where ==== is a single or double bond which comprises starting with a steroidal propargyl alcohol of the formula

IV

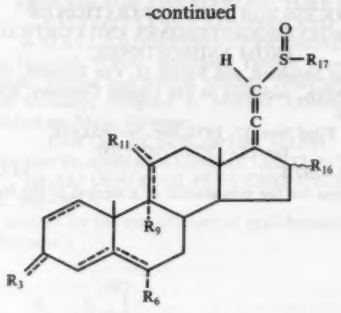


where R_3, R_6, R_9, R_{11}, R_{16}, ~, and ==== are defined above and subjecting the steroidal propargyl alcohol IV to the following reactions:

1. sulfenylating with a substituted sulfenylating agent of the formula R_{17}-S-M; where M is a chlorine or bromine atom, phenylsulfone, phthalimide or imidazole group; where R_{17} is alkyl of one thru 10 carbon atoms, trichloromethyl, phenyl or phenyl substituted with one thru 3 nitro groups or substituted with one thru 3 trifluoromethyl groups, aralkyl of 7 thru 12 carbon atoms, phthalimide, $(R_{121})_2$-N where R_{121} is alkyl of one thru 10 carbon atoms, phenyl, phenyl substituted with alkyl of one thru 4 carbon atoms, aralkyl of 7 thru 12 carbon atoms with the proviso that the two R_{121} groups may be the same or different, to form an allene sulfoxide of the formula

VI

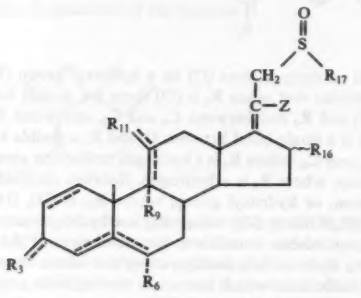
-continued



where R_3, R_6, R_9, R_{11}, R_{16}, R_{17}, ~, and ═══ are defined above;

2. Michael addition to the allene sulfoxide of step (1) with an alkoxide, mercaptide or dialkyl amine to form a sulfoxide of the formula

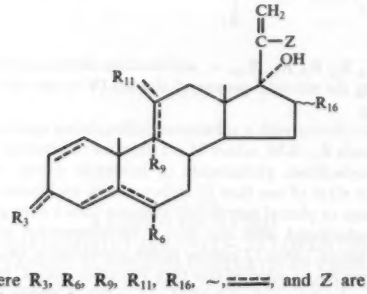
VII



where R_3, R_6, R_9, R_{11}, R_{16}, R_{17}, ~, and ═══ are defined above and where Z is $-O-R_{20}$, $-S-R_{120}$ or $-N-(R_{120})_2$ where R_{20} is alkyl of one thru 5 carbon atoms, phenyl or phenyl substituted with one thru 4 carbon atoms, or alkyl of 7 thru 12 carbon atoms, and where R_{120} is alkyl of one thru 5 carbon atoms;

3. reacting the product of step (2) with a thiophile selected from the group consisting of trimethylphosphite and diethylamine to form a compound of the formula

IX



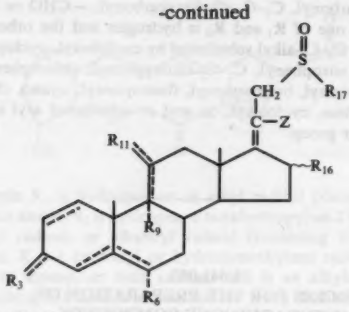
where R_3, R_6, R_9, R_{11}, R_{16}, ~, ═══, and Z are defined above; and

4. hydrolyzing the product of step (3) in the presence of an effective catalytic amount of an acid.

60. A sulfoxide of the formula

VII

-continued



where R_3, R_6, R_9, R_{11}, R_{16}, R_{17}, R_{20}, R_{120}, R_{121}, ~, ═══ and Z are defined in claim 1.

4,041,056

REACTION PRODUCTS OF WAX-ANHYDRIDE COMPOUNDS AND POLYAMINES

William J. Heintzelman, and Michael I. Naiman, both of St. Louis, Mo., assignors to Petrolite Corporation, St. Louis, Mo.

Continuation of Ser. No. 107,569, Jan. 18, 1971, abandoned, which is a division of Ser. No. 607,877, Jan. 9, 1967, Pat. No. 3,590,076, which is a continuation-in-part of Ser. No. 527,075, Feb. 14, 1966, abandoned. This application Mar. 12, 1976, Ser. No. 666,256

Int. Cl.[2] C11C 3/00

U.S. Cl. 260—404.5 **11 Claims**

1. A wax-maleic compound coupled with a polyfunctional polyamine selected from the group cosisting of

1. a polyamine of the formula

(1) a polyamine of the formula

$$NH_2-\left(\begin{matrix}H\\|\\AN\end{matrix}\right)_n-H$$

wherein A is $-(CH_2)_m-$, $\begin{matrix}CH_3\\|\\CH-CH_2-\end{matrix}$,

$-CH_2-\begin{matrix}CH\\|\\CH_3\end{matrix}-CH_2-$, or $-\begin{matrix}CH_3\\|\\CH\end{matrix}-\begin{matrix}CH_3\\|\\CH\end{matrix}-$

m being 2–10, and n is 1–8,

(2) $C_8H_{17}\overset{H}{\underset{|}{N}}-CH_2CH_2NH_2$,

(3) $C_{14}H_{29}\overset{H}{\underset{|}{N}}-CH_2CH_2NH_2$,

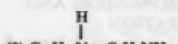
(4) $C_{16}H_{33}\overset{H}{\underset{|}{N}}-CH_2CH_2NH_2$,

(5) $C_{12}H_{25}\overset{H}{\underset{|}{N}}-C_2H_4\overset{H}{\underset{|}{N}}C_2H_4\overset{H}{\underset{|}{N}}-C_2H_4NH_2$,

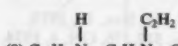
(6) $C_{12}H_{25}\overset{H}{\underset{|}{N}}-C_3H_6NH_2$,

(7) $C_{13}H_{31}\overset{H}{\underset{|}{N}}-C_3H_6NH_2$,

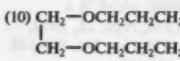
-continued



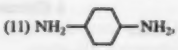
(8) $C_{10}H_{21}NH-C_4H_8NH_2$,



(9) $C_{12}H_{25}N(H)-C_3H_6N(C_2H_2)-C_2H_4-NH_2$,

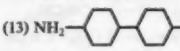


(10) $CH_2-OCH_2CH_2CH_2NH_2$
$CH_2-OCH_2CH_2CH_2NH_2$,

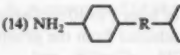


(11) NH_2-C$_6$H$_4$-NH_2,

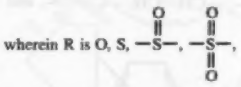
(12) m-phenylene diamine,



(13) NH_2-C$_6$H$_4$-C$_6$H$_4$-NH_2,



(14) NH_2-C$_6$H$_4$-R-C$_6$H$_4$-NH_2,

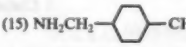


wherein R is O, S, $-S-$, $-S(=O)_2-$,

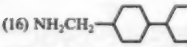
x being 1–4,

R′ being H or alkyl,

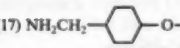
R′ being alkyl,



(15) NH_2CH_2-C$_6$H$_4$-CH_2NH_2,



(16) NH_2CH_2-C$_6$H$_4$-C$_6$H$_4$-CH_2NH_2, and



(17) NH_2CH_2-C$_6$H$_4$-O-C$_6$H$_4$-CH_2NH_2

said wax-maleic compound having a wax molecule moiety to which at least one maleic compound unit is attached,

(1) said maleic compound being selected from the group consisting of maleic acid, maleic anhydride, citraconic acid, citraconic anhydride, ethyl maleic acid, ethyl maleic anhydride, glutaconic acid, glutaconic acid anhydride, itaconic acid, itaconic acid anhydride, methylitaconic acid and methylitaconic acid anhydride and (2) said wax being selected from the group consisting of plastic microcrystalline waxes, tank bottom microcrystalline waxes, solvent extracted microcrystalline waxes, Fischer-Tropsch waxes, and mixtures thereof, having a melting point of at least 150° F. and a penetration of from about 0+ to about 50 (ASTM Test Method D5-25), the molar ratio of (1) to (2) being from about 1.0 to about 1.5.

4,041,057

HYDROESTERIFICATION PROCESS

Robert J. Fanning, Farmington Hills, Mich., assignor to Ethyl Corporation, Richmond, Va.

Filed July 2, 1975, Ser. No. 592,642
Int. Cl.² C11C *3/02*; C07C *67/04, 67/38*
U.S. Cl. 260—410.9 R **7 Claims**

1. A process for producing esters which comprises:

A. reacting olefin having from about 3 to about 40 carbon atoms per molecule, CO and alcohol having from about 1 to about 20 carbon atoms per molecule in the presence of cobalt carbonyl catalyst to produce ester in admixture with residual catalyst and residual reactants,

B. recovering at least a portion of the ester product from said reaction thereby producing a cobalt-containing catalyst residue,

C. heating the catalyst residue at a temperature of from about 1000° F to about 4000° F under oxidizing conditions wherein the cobalt of the catalyst residue is converted to cobalt oxide,

D. reacting the cobalt oxide with carbon monoxide and hydrogen to form a cobalt carbonyl complex, and

E. recycling the cobalt carbonyl complex to the olefin-CO-alcohol reaction step to provide at least a portion of the catalyst therein.

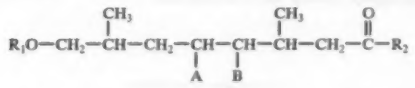
4,041,058

SYNTHESIS OF 2,6,10-TRIMETHYL-UNDECAN-1-OL

Noal Cohen, Montclair, and Gabriel Saucy, Essex Fells, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation-in-part of Ser. No. 544,154, Jan. 27, 1975, abandoned. This application Dec. 8, 1975, Ser. No. 638,722
Int. Cl.² C11C *3/02*; C07D *309/22*
U.S. Cl. 260—410.9 R **5 Claims**

1. A compound of the formula:



$R_1O-CH_2-CH(CH_3)-CH_2-CH(A)-CH(B)-CH(CH_3)-CH_2-C(=O)-R_2$

wherein A and B are individually hydrogen or taken together form a carbon to carbon bond; R_2 is lower alkoxy; R_1 is t-butyl, tetrahydropyranyl, benzyl, benzhydryl or trityl with the proviso that when R_1 is benzyl, benzhydryl or trityl, A and B form a carbon to carbon bond.

4,041,059

METHOD OF IMPROVING THE OXIDATION RESISTANCE OF AN OIL OR FAT

Haruo Watanabe, Funabashi; Toru Kitagawa, Ichikawa; Masaaki Negishi, Chiba; Kiichi Aonuki, Tokyo, and Harunobu Kobayashi, Musashino, all of Japan, assignors to Showa Sangyo Co. Ltd., Tokyo, Japan

Continuation of Ser. No. 426,501, Dec. 20, 1973, abandoned. This application June 24, 1975, Ser. No. 589,665
Claims priority, application Japan, Dec. 25, 1972, 47-855
Int. Cl.² B01D *11/00*
U.S. Cl. 260—424 **11 Claims**

1. A method for improving the oxidation resistance of an animal or vegetal fat or oil containing an amount of a heavy metal sufficient to catalyze autoxidation of said fat or oil, which comprises:

a. subjecting said fat or oil to steam distillation while in contact with a body of said heavy metal for a period sufficient to pick up said amount of said heavy metal;

b. intimately contacting said fat or oil in the liquid state with solid citric, malic, or tartaric acid,

1. the amount of said acid being sufficient to leave at least a major portion thereof undissolved after said contacting,

2. the temperature of said fat or oil during said contacting being below the melting point of said acid; and

c. separating the undissolved acid from said fat or oil.

4,041,060

PROCESS FOR SYNTHESIZING ORGANO-TIN COMPOUNDS

Andre Paul de Haan, Avenue Lemiez, 35 - B 7020 Hyon, Belgium

Continuation-in-part of Ser. No. 564,978, April 3, 1975, abandoned. This application Apr. 7, 1976, Ser. No. 674,537
Claims priority, application Belgium, Apr. 3, 1974, 142797
Int. Cl.[2] C07F *7/22*
U.S. Cl. 260—429.7 **8 Claims**

1. A process for synthesizing organo-tin halides of the formula R_nSnX_{4-n}, wherein R represents an alkyl or aryl radical, X represents a halogen atom and n represents an integer equal to 1, 2 or 3, by reacting an organic halide of the formula RX, wherein R and X have the meanings indicated above, in the gaseous phase at a temperature between 300°and 400° C, with finely divided solid alloy particles consisting of tin and a catalyst of the group consisting of copper, gold and silver, characterized in that contact of the solid alloy particles, having a particle size between about 50 and 250 microns, with one another is avoided by separating said particles in a fluidized bed by means of a fluid, comprising said organic halide mixed with an inert gas, at a flow rate of 5 to 40 l/hour-cm2, by admixing refractory particles with said alloy particles and by thoroughly stirring the fluidized bed.

4,041,061

MODIFIED CYANOACRYLATE MONOMERS AND METHODS OF PREPARATION

Carl J. Buck, Berkeley Heights, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.

Continuation-in-part of Ser. No. 633,146, Nov. 18, 1975, abandoned, which is a division of Ser. No. 512,276, Oct. 4, 1974, Pat. No. 3,975,422, which is a continuation-in-part of Ser. No. 308,375, Nov. 21, 1972, abandoned, and Ser. No. 308,376, Nov. 21, 1972, abandoned. This application June 23, 1976, Ser. No. 699,146
Int. Cl.[2] C07C *121/46, 121/54*
U.S. Cl. 260—464 **1 Claim**

1. A monomer composition of the formula

where *x* and *y* are integers of from 1 to 6 inclusive and

is a 1,2; 1,3; 1,4 substituted cyclohexane ring or a meta, para or ortho substituted benzene ring.

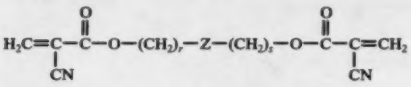
4,041,062

MODIFIED CYANOACRYLATE MONOMERS AND METHODS OF PREPARATION

Carl J. Buck, Berkeley Heights, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.

Continuation-in-part of Ser. No. 633,146, Nov. 18, 1975, abandoned, which is a division of Ser. No. 512,276, Oct. 4, 1974, Pat. No. 3,975,422, which is a continuation-in-part of Ser. No. 308,375, Nov. 21, 1972, abandoned, which is a continuation-in-part of Ser. No. 308,376, Nov. 21, 1972, abandoned. This application June 23, 1976, Ser. No. 699,148
Int. Cl.[2] C07C *121/20, 121/60*
U.S. Cl. 260—465 D **6 Claims**

1. A monomer composition of the formula



where *r* and *s* are independent integers of from 1 to 10 inclusive and *r* and *s* total from 2 to 20 and Z is selected from the group consisting of: —O—, —S—, —CH=CH, —C≡C—, and

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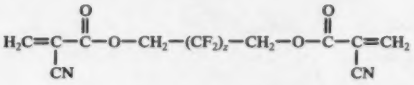
4,041,063

MODIFIED CYANOACRYLATE MONOMERS AND METHODS OF PREPARATION

Carl J. Buck, Berkeley Heights, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.

Continuation-in-part of Ser. No. 633,146, Nov. 18, 1975, abandoned, which is a division of Ser. No. 512,276, Oct. 4, 1974, Pat. No. 3,975,422, which is a continuation-in-part of Ser. No. 308,375, Nov. 21, 1972, abandoned, and Ser. No. 308,376, Nov. 21, 1972, abandoned. This application June 23, 1976, Ser. No. 699,129
Int. Cl.[2] C07C *121/30*
U.S. Cl. 260—465.4 **1 Claim**

1. A monomer composition of the formula



where *z* is an integer of from 1 to 10 inclusive.

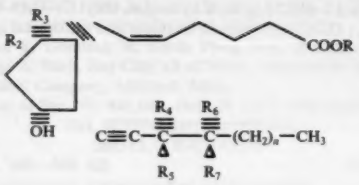
4,041,064

16-METHYL PROST-5-EN-13-YNOIC ACID DERIVATIVES

Carmelo Gandolfi; Gianfederico Doria; Renato Pellegata, and Maria M. Usardi, all of Milan, Italy, assignors to Carlo-Erba S.p.A., Milan, Italy

Filed July 29, 1975, Ser. No. 600,187
Claims priority, application Italy, Sept. 17, 1974, 27333/74
Int. Cl.[2] C07C *177/00*
U.S. Cl. 560—121 **13 Claims**

1. A compound of the formula:



wherein:

R is hydrogen, a C_1–C_{12} alkyl group or a cation of a pharmaceutically acceptable base;

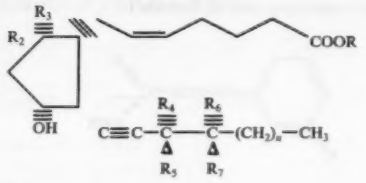
R_2 and R_3 taken together form an oxo group;

one of R_4 and R_5 is hydrogen and the other is a hydroxy group;

R_6 is a 16(S) C_1–C_4 alkyl group and R_7 is hydrogen; and

n is an integer of 3 to 6.

3. A compound of the formula:



wherein:

R is hydrogen, a C_1–C_{12} alkyl group or a cation of a pharmaceutically acceptable base;

R_2 and R_3 taken together form an oxo group;

one of R_4 and R_5 is hydrogen and the other is a hydroxy group;

R_6 is hydrogen and R_7 is a 16(R) C_1–C_4 alkyl group; and

n is an integer from 3 to 6.

4,041,065

POLYAMIDE-IMIDES PREPARED FROM 4-CARBOXY-PHTHALIMIDE ALIPHATIC CARBOXYLIC ACIDS

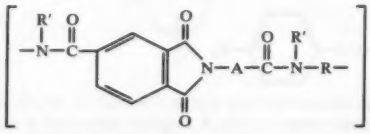
Steven E. Lindberg, Naperville; Kerford A. Marchant, Jr., Evanston, both of Ill., and Richard E. Van Strien, Griffith, Ind., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Jan. 24, 1975, Ser. No. 543,967

Int. Cl.[2] C08G *73/14*

U.S. Cl. 260—47 CZ **10 Claims**

1. An amide-imide type polymeric composition with an inherent viscosity of 0.1 to 10.0 consisting essentially of recurrent units of:



where A is a difunctional alkylene radical having from 1 to 11 carbon atoms, R is a bivalent hydrocarbon radical having from 2 to 20 carbon atoms, and R′ is either hydrogen or methyl.

4,041,066

4,5-CIS-DIDEHYDRO-PGE$_1$ COMPOUNDS

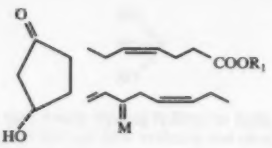
Bengt Samuelsson, Stockholm, Sweden, and Barney J. Magerlein, Portage, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 440,628, Feb. 7, 1974, Pat. No. 3,954,835, which is a continuation of Ser. No. 248,005, April 27, 1972, abandoned. This application Sept. 9, 1975, Ser. No. 611,804

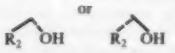
Int. Cl.[2] C07C *177/00*

U.S. Cl. 260—468 D **6 Claims**

1. An optically active compound of the formula



or a racemic compound of that formula and the mirror image thereof, wherein M is



wherein R_2 is hydrogen, methyl, or ethyl; wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive; including the lower alkanoates thereof, and the pharmacologically acceptable salts thereof when R_1 is hydrogen.

4. 15(R)-15-Methyl-4,5-cis-didehydro-PGE$_1$, and the methyl ester thereof.

4,041,067

SYNTHESIS OF OXALATE ESTERS BY THE OXIDATIVE CARBONYLATION OF AMIDE ACETALS

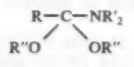
Lee R. Zehner, Media, and John G. Zajacek, Devon, both of Pa., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed July 21, 1976, Ser. No. 707,391

Int. Cl.[2] C07C *69/36*

U.S. Cl. 260—485 R **23 Claims**

1. A process for the preparation of oxalate esters which comprises reacting under substantially anhydrous conditions, an amide acetal having the formula



wherein R may be hydrogen, an alkyl, aryl or alicyclic group and R′ and R″ may be an alkyl or aralkyl group, which R, except when hydrogen, R′ and R″ may contain substituents which do not interfere with the reaction, with carbon monoxide and oxygen at a pressure of between about 500 psi and 3000 psi and at a temperature in the range of about 50° to 200° C. in the presence of an effective amount of a catalyst selected from the group consisting of palladium, platinum, rhodium, cadmium, cobalt, zinc and copper salt compounds and a catalytic amount of an aliphatic, cycloaliphatic, aromatic or heterocyclic amine or ammonia and a catalytic amount of a monohydric, aliphatic, alicyclic or aralkyl alcohol which may contain other substituents which do not interfere with the reaction, and recovering the desired oxalate ester.

4,041,068

SYNTHESIS OF OXALATE ESTERS BY CATALYTIC OXIDATIVE CARBONYLATION OF BORATE ESTERS

Lee R. Zehner, Media, and John G. Zajacek, Devon, both of Pa., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed June 29, 1976, Ser. No. 700,947
Int. Cl.[2] C07C *69/36*
U.S. Cl. 260—485 R 27 Claims

1. A process for the preparation of oxalate esters which comprises reacting under substantially anhydrous conditions in orthoborate ester having the formula

wherein R is alkyl or aralkyl groups which may contain substituents which do not interfere with the reaction, with carbon monoxide and oxygen at a pressure of between about 500 psi and 3000 psi and at a temperature in the range of about 50° C. to 200° C. in the presence of an effective amount of a catalyst selected from the group consisting of palladium, platinum and rhodium salt compounds and a catalytic amount of an aliphatic, cycloaliphatic, aromatic or heterocyclic amine, and a catalytic amount of a monohydric aliphatic, alicyclic or aromatic alcohol which may contain substituents which do not interfere with the reaction, and recovering the desired oxalate ester.

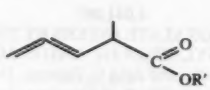
4,041,069

ALKYL-2-METHYL-3,4-PENTADIENOATES

John B. Hall, Rumson; Denis E. Hruza, Brick Town; Manfred Hugo Vock, Locust; Joaquin Vinals, Red Bank, all of N.J., and Edward J. Shuster, Brooklyn, N.Y., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Division of Ser. No. 566,118, April 8, 1975, Pat. No. 3,978,239. This application May 5, 1976, Ser. No. 683,303
Int. Cl.[2] C07C *69/54*
U.S. Cl. 260—486 R 3 Claims

1. A compound having the structure:



wherein R′ is selected from the group consisting of n-hexyl and isobutyl.

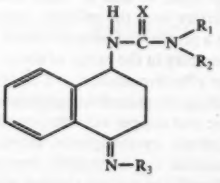
4,041,070

TETRAHYDRO-4-IMINO-1-NAPHTHYLUREAS

Goro Asato, Titusville, and Terence James Bentley, Cranbury, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed July 14, 1976, Ser. No. 705,313
Int. Cl.[2] C07C *127/19, 157/09;* A61K *31/17, 31/175*
U.S. Cl. 260—553 A 5 Claims

1. A compound of formula:



wherein X is oxygen or sulfur; R_1 is hydrogen or alkyl C_1–C_4; R_2 is hydrogen, alkyl C_1–C_4, 2-propynyl, alkoxy C_1–C_4 or benzyloxy; R_3 is a radical selected from the group consisting of —OR_4, and —$N(CH_3)_2$; R_4 is hydrogen, alkyl C_1–C_4 or benzyl; R_5 is alkyl C_1–C_4; the racemic mixtures and the optical isomers thereof.

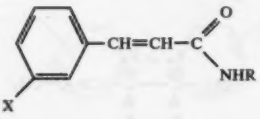
4,041,071

ANTI-CONVULSANT CINNAMIDE COMPOUNDS

Eugene M. Grivsky, Chapel Hill, N.C., assignor to Burroughs Wellcome Co., Research Triangle Park, N.C.

Filed July 17, 1975, Ser. No. 596,653
Claims priority, application United Kingdom, Aug. 9, 1974, 35279/74
Int. Cl.[2] C07C *103/22, 103/76;* A61K *31/165*
U.S. Cl. 260—558 R 6 Claims

1. The compound trans 3-iodocinnamamide.
2. Trans 3 - Bromo - N - ethylcinnamamide.
3. The trans compound of formula I



(I)

where X is iodo and R is alkyl having 1 to 3 carbons.

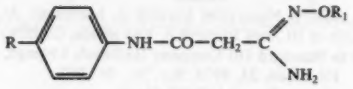
4,041,072

ACETAMIDOXIME COMPOUNDS

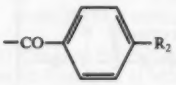
Claude P. Fauran, Paris; Guy R. Bourgery, Colombes, and Claude J. Gouret, Meudon, all of France, assignors to Delalande S. A., Courbevoie, France

Filed Mar. 18, 1976, Ser. No. 668,061
Claims priority, application France, Mar. 25, 1975, 75.09263; Feb. 24, 1976, 76.05098
Int. Cl.[2] C07C *103/28, 103/76, 103/365;* A61K *31/165*
U.S. Cl. 260—558 A 19 Claims

1. A compound having the formula



wherein
R is hydrogen, chloro, alkyl having one to 4 carbons or alkoxy having one to 3 carbons,
R_1 is hydrogen,



wherein
R_2 is hydrogen, chloro, nitro, alkoxy having one to 3 carbons or —CF_3 or —CO—NH—R_3 wherein
R_3 is alkyl having one to 4 carbons, cycloalkyl having no more than 6 carbons, or phenyl.

4,041,073
3,4,5-TRICHLORO-N,N-di(LOWERALKYL)-2-(MERCAPTO) BENZENESULFONAMIDES

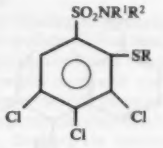
Christian T. Goralski; R. Garth Pews, both of Midland, and George A. Burk, Bay City, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 645,060, Dec. 29, 1975. This application Oct. 6, 1976, Ser. No. 730,034

Int. Cl.[2] C07C *143/78*

U.S. Cl. 260—556 AR 3 Claims

1. A compound corresponding to the formula



wherein R represents hydrogen; and each of R^1 and R^2 represents loweralkyl of 1 to 4 carbon atoms.

4,041,074
1-HYDROXYARYL-2-AMIDOALKYLAMINOETHANOL DERIVATIVES

Brian Geoffrey Main, Macclesfield, England, assignor to Imperial Chemical Industries Limited, London, England

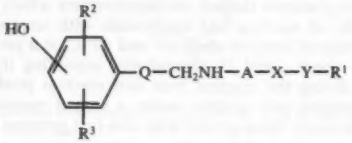
Division of Ser. No. 607,932, Aug. 26, 1975, Pat. No. 3,957,870, which is a division of Ser. No. 485,994, July 5, 1974, Pat. No. 3,933,911. This application Mar. 1, 1976, Ser. No. 662,953

Claims priority, application United Kingdom, July 19, 1973, 34465/73

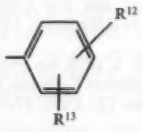
Int. Cl.[2] C07C *143/74, 143/77, 143/78;* A61K *31/18*

U.S. Cl. 260—556 AR 6 Claims

1. A phenylethylamine derivative selected from compounds of the formula:



wherein A is alkylene of up to 6 carbon atoms, wherein Q is carbonyl or hydroxymethylene, wherein R^1 is alkyl or cycloalkyl each of up to 6 carbon atoms, or aryl of the formula:



wherein R^2, R^3, R^{12} and R^{13}, which may be the same or different, each is hydrogen, halogen, hydroxy, amino or hydroxymethyl, alkyl, alkoxy, acylamino or alkanesulphonamido each of up to 6 carbon atoms, or phenyl, wherein X is $NHSO_2$ and wherein Y is a direct link, or is alkylene or alkyleneoxy each of up to 6 carbon atoms; and the acid-addition salts thereof.

4,041,075
PHENOXY-ALKANOLAMINE DERIVATIVES

Leslie Harold Smith, Macclesfield, England, assignor to Imperial Chemical Industries Limited, London, England

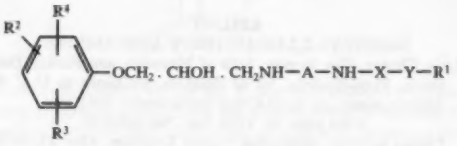
Division of Ser. No. 526,921, Nov. 25, 1974, Pat. No. 3,959,369. This application Mar. 4, 1976, Ser. No. 664,044

Claims priority, application United Kingdom, Dec. 12, 1973, 57517/73

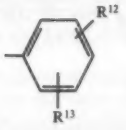
Int. Cl.[2] C07C *103/38, 103/78;* A61K *31/16, 31/165*

U.S. Cl. 260—558 P 7 Claims

1. An alkanolamine derivative selected from a compound of the formula:



wherein A is alkylene of from 2 to 12 carbon atoms; wherein R^1 is hydrogen, alkyl, halogenoalkyl, alkenyl or cycloalkyl each of up to 10 carbon atoms, or aryl of the formula:



wherein wherein R^2 and R^3, which may be the same or different, each is hydrogen, halogen, hydroxy, amino, nitro or cyano, or alkyl, cycloalkyl, alkenyl, alkoxy, alkylthio, alkenyloxy or alkanoyl each of up to 6 carbon atoms, and wherein R^{12} and R^{13}, which may be the same or different, each is hydrogen, halogen, hydroxy, amino, nitro or cyano, or alkyl, alkenyl, alkoxy, alkenyloxy or alkanoyl each of up to 6 carbon atoms, or wherein R^{12} and R^{13} together are trimethylene, tetramethylene, propenylene, but-2-enylene or buta-1,3-dienylene such that together with the adjacent benzene ring they form respectively indanyl, 5,6,7,8-tetrahydronaphthyl, indenyl, 5,8-dihydronaphthyl or naphthyl; wherein R^4 stands for a substituent of the formula:

$R^{15}R^{16}N—CO—Q—$

$R^{15}R^{16}N—CO—NH—Q—$

$R^{15}R^{16}N—CO—Q^1—O—$

or

Ti $R^{16}—X—NR^{15}—Q—$

wherein Q is a direct link or is alkylene or alkenylene each of up to 6 carbon atoms; wherein Q^1 is alkylene of up to 6 carbon atoms; wherein R^{15} is hydrogen or alkyl of up to 6 carbon atoms; wherein R^{16} is hydrogen, or alkenyl, cycloalkyl, hydroxyalkyl or alkoxyalkyl each of up to 6 carbon atoms, or alkyl, aryl, aralkyl or aralkenyl each of up to 10 carbon atoms; wherein X is carbonyl and wherein Y is a direct link, or is alkylene, oxyalkylene or alkyleneoxy each of up to 6 carbon atoms, or, except when R^1 is hydrogen, is oxygen; and a non-toxic, pharmaceutically-acceptable acid-addition salt thereof.

4,041,076

IMMUNOASSAY FOR PHARMACOLOGICALLY ACTIVE PHENETHYLAMINES

Richard William Avenia, Nutley; James Gordon Christenson, North Caldwell, and Benjamin Pecherer, Montclair, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 517,267, Oct. 23, 1974, abandoned. This application Mar. 9, 1976, Ser. No. 665,205
Int. Cl.[2] C07C *103/38*
U.S. Cl. 260—559 A 2 Claims

1. N-[2-(4-hydroxyphenyl)ethyl]-2-[4-(2-aminopropyl)-phenoxy] acetamide.

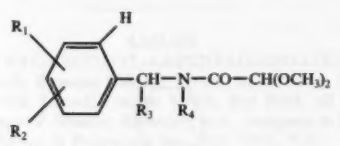
4,041,077

N-BENZYL-2,2-DIMETHOXY-ACETAMIDES

Léon Ghosez; Guy Rossey, both of Heverlee, and Freddy Didderen, Petit-Rechain, all of Belgium, assignors to U C B, Societe Anonyme, Saint-Gilles-lez-Brussels, Belgium

Filed May 24, 1976, Ser. No. 689,148
Claims priority, application United Kingdom, May 27, 1975, 23184/75; May 27, 1975, 23183/75
Int. Cl.[2] C07C *103/127, 103/34*
U.S. Cl. 260—562 R 21 Claims

1. An N-benzyl-2,2-dimethoxy-acetamide of the formula



wherein

R_a and R_2 each represents hydrogen, halogen, alkyl having 1 to 6 carbon atoms, alkoxy having 1 to 6 carbon atoms, phenyl or naphthyl, said phenyl and naphthyl being unsubstituted or substituted by halogen, alkyl having 1 to 6 carbon atoms or alkoxy having 1 to 6 carbon atoms,

R_3 is hydrogen, alkyl having 1 to 6 carbon atoms, phenyl, naphthyl, benzyl, phenethyl, cyclopentyl or cyclohexyl, said phenyl, naphthyl, benzyl, phenethyl, cyclopentyl and cyclohexyl being unsubstituted or ring-substituted by halogen, alkyl having 1 to 6 carbon atoms or alkoxy having 1 to 6 carbon atoms, and

R_4 is hydrogen, alkyl having 1 to 6 carbon atoms, phenyl, naphthyl, benzyl or phenethyl, said phenyl, naphthyl, benzyl and phenethyl being unsubstituted or ring-substituted by halogen, alkyl having 1 to 6 carbon atoms or alkoxy having 1 to 6 carbon atoms.

4,041,078

METHOD OF PREPARING POLYAMINOPOLYPHENYLMETHANES

Edward T. Marquis, and Lewis W. Watts, Jr., both of Austin, Tex., assignors to Texaco Development Corporation, New York, N.Y.

Filed Sept. 30, 1976, Ser. No. 728,085
Int. Cl.[2] C07C *85/24*
U.S. Cl. 260—570 D 3 Claims

1. A method of preparing diaminodiphenylmethane and higher homologues thereof which comprises the step of condensing aniline and formaldehyde in the presence of a fluorinated graphite catalyst.

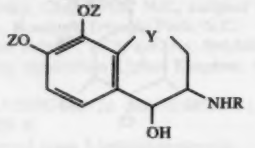
4,041,079

BICYCLIC COMPOUNDS

Hirosada Sugihara, Osaka; Michio Motohashi, Kobe; Masazumi Watanabe, Osaka; Masao Nishikawa, Kyoto, and Yasushi Sanno, Osaka, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Dec. 13, 1973, Ser. No. 424,315
Claims priority, application Japan, Dec. 18, 1972, 47-126970
Int. Cl.[2] C07C *91/40*
U.S. Cl. 260—574 8 Claims

1. A compound selected from the group consisting of compounds of the formula



wherein Y represent methylene, Z represents hydrogen and R represents hydrogen or alkyl of 1 to 6 carbon atoms, and pharmaceutically acceptable salts thereof.

4,041,080

PROCESS FOR THE PRODUCTION OF PRIMARY AMINES

Herbert Göthel, Oberhausen-Holten; Boy Cornils; Hans Feichtinger, both of Dinslaken; Hans Tummes, Oberhausen-Sterkrade-Nord, and Jurgen Falbe, Dinslaken, all of Germany, assignors to Ruhrchemie Aktiengesellschaft, Oberhausen, Germany

Continuation of Ser. No. 182,773, Sept. 22, 1971, abandoned. This application Nov. 20, 1973, Ser. No. 417,590
Claims priority, application Germany, Oct. 3, 1970, 2048750
Int. Cl.[2] C07C *85/02*
U.S. Cl. 260—585 B 11 Claims

1. In a process for the production of a primary amine by conversion at a first pressure of a compound selected from the group consisting of an aliphatic aldehyde having 2–15 carbon atoms, a cycloaliphatic aldehyde and an aryl aldehyde, said aldehydes containing no other functional group other than a carbonyl group, with ammonia to produce a reaction product and catalytic hydrogenation of said reaction product in the presence of a catalyst, wherein the catalyst contains cobalt, nickel, or a mixture thereof, the improvement which consists essentially of reacting said compounds with ammonia at a temperature of between about 15° and 80° C. at a pressure of between about 1 and 15 atmospheres, separating the water formed during the reaction from said reaction product and hydrogenating said product under a second pressure, said second pressure being greater than said first pressure.

4,041,081

METHOD FOR THE PREPARATION OF PURE N-ALDEHYDES

Ludger Bexten, Kirchhellen; Heinz Noeske, Oberhausen; Hans Tummes, Oberhausen, and Boy Cornils, Dinslaken, all of Germany, assignors to Ruhrchemie Aktiengesellschaft, Oberhausen, Germany

Filed Dec. 4, 1975, Ser. No. 637,739
Claims priority, application Germany, Dec. 14, 1974, 2459152
Int. Cl.[2] C07C *47/02*
U.S. Cl. 260—601 R 15 Claims

1. A process for the isolation of n-aldehyde from an organic solution containing n-aldehyde and i-aldehyde obtained by the reaction of an olefin with carbon monoxide and hydrogen in the presence of a catalyst at a reaction temperature between room temperature and 130° C. by adding no more than a stoichiometric amount based on said n-aldehyde of an alkali metal hydrogen sulfite in aqueous solution to said organic solution

whereby a preciptate of n-aldehyde hydrogen sulfite is formed, and removing said n-aldehyde from said preciptate.

4,041,082

PROCESS FOR PRODUCING ALDEHYDES

Takeru Onoda, Yokohama, and Tetsuo Masuyama, Machida, both of Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo, Japan

Filed July 25, 1975, Ser. No. 599,198
Claims priority, application Japan, July 25, 1974, 49-85523
Int. Cl.[2] C07C *45/08*
U.S. Cl. 260—604 HF **18 Claims**

1. In a process for producing an aldehyde including the steps of supplying to a hydroformylation reaction zone an olefin selected from the group consisting of ethylene, propylene, butene and hexene, carbon monoxide and hydrogen together with a catalyst solution consisting essentially of a solvent and a rhodium-tertiary phosphine complex catalyst dissolved therein to form an aldehyde, distilling the reaction mixture obtained from the hydroformylation reaction zone and containing the aldehyde formed in a distillation zone to separate the aldehyde from the catalyst solution, and recycling the catalyst solution from the distillation zone to the hydroformylation reaction zone, the improvement which comprises contacting at least a part of the catalyst solution with carbon dioxide having the partial pressure higher than about 1 Kg/cm^2 at a temperature of about 60° to 200° C in the hydroformylation reaction zone.

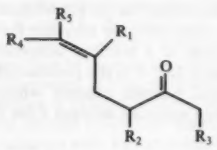
4,041,083

PROCESS FOR THE SELECTIVE HYDROGENATION OF THE KETO GROUP IN NONCONJUGATED OLEFINIC KETONES

Peter S. Gradeff, Andover, and Giuseppe Formica, Piscataway, both of N.J., assignors to Rhodia, Inc., New York, N.Y.

Filed Sept. 30, 1976, Ser. No. 728,346
Int. Cl.[2] C07C *29/00*
U.S. Cl. 260—617 C **16 Claims**

1. A process for the preparation of olefinically unsaturated alcohols which comprises selectively hydrogenating the keto group of nonconjugated olefinic ketones having the general formula:



wherein

R_1 is selected from the group consisting of hydrogen, methyl and ethyl; and

R_1 taken together with one of R_4 and R_5 to form an unsaturated cycloaliphatic ring;

R_2 is selected from the group consisting of hydrogen, and, when R_3 is hydrogen, methyl;

R_3 is selected from the group consisting of hydrogen, and, when R_2 is hydrogen, methyl, ethyl and phenyl; and

R_2 and R_3 taken together to form a six-membered saturated cycloaliphatic ring comprising the keto group;

R_4 and R_5 are selected from the group consisting of alkyl, aryl, alkaryl, aralkyl, cycloalkyl, alkcycloalkyl and cycloalkalkyl, having from one to about fifty carbon atoms; and

R_4 and R_5 taken together to form a cycloaliphatic ring; in the presence of hydrogen; chromium-promoted Raney nickel prepared by alkaline digestion of the alloy of nickel aluminum and chromium and containing from about 0.5 to about 20% by weight chromium; a strong alkali selected from the group consisting of alkali metal hydroxides and alcoholates having from one to about thirty carbon atoms; and a lower alkanol having from one to two carbon atoms.

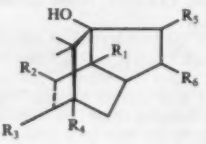
4,041,084

TRICYCLIC ALCOHOLS

Kenneth K. Light, Long Branch, N.J.; Edward J. Shuster, Brooklyn, N.Y.; Joaquin F. Vinals, Red Bank, and Manfred Hugo Vock, Locust, both of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Continuation-in-part of Ser. No. 485,554, July 3, 1974, abandoned. This application May 5, 1976, Ser. No. 683,246
Int. Cl.[2] C07C *35/22*
U.S. Cl. 260—617 F **3 Claims**

1. A compound having the structure:



wherein each of R_1, R_2, R_3, R_4, R_5 and R_6 is selected from the group consisting of hydrogen and methyl; wherein the dashed line is a carbon-carbon single bond or a carbon-carbon double bond; and wherein when the dashed line is a carbon-carbon single bond, one of R_2 or R_3 is hydrogen.

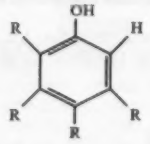
4,041,085

ORTHO-ALKYLATION OF PHENOLS

Alton J. Frabetti, Jr., Wrentham, Mass., assignor to General Electric Company, Pittsfield, Mass.

Continuation of Ser. No. 852,453, Aug. 22, 1969, abandoned. This application Nov. 17, 1975, Ser. No. 632,561
Int. Cl.[2] C07C *37/16*
U.S. Cl. 260—621 R **12 Claims**

1. In a process for selectively alkylating a phenol in the ortho position which comprises the vapor phase reaction in the presence of a magnesium oxide alkylation catalyst of an alkyl alcohol and a phenol having the general formula:



where R is a monovalent substituent from the group consisting of hydrogen, alkyl, phenyl and alkyl substituted phenyl; the improvement comprising adding water vapor to the vapor phase reaction in which said phenol is treated with said alkyl alcohol.

4,041,086

PROCESS OF MANUFACTURE OF FLOURINATED ALKYLADAMANTANES

Robert E. Moore, New Castle County, Del., and Edward J. Janoski, Havertown, Pa., assignors to Sun Ventures, Inc., St. Davids, Pa.

Continuation-in-part of Ser. No. 224,266, Feb. 7, 1972, abandoned, which is a continuation-in-part of Ser. No. 314,529, Oct. 7, 1963, abandoned, and Ser. No. 440,614, March 17, 1965, Pat. No. 3,641,167. This application Jan. 12, 1976, Ser. No. 647,944
The portion of the term of this patent subsequent to Feb. 8, 1989, has been disclaimed.
Int. Cl.[2] C07C *23/18*
U.S. Cl. 260—648 F **5 Claims**

1. Highly fluorinated hydrocarbons formed by fluorinating an alkyladamantane having from 11 to 30 carbon atoms in

which the degree of fluorination is at least 75% of that corresponding to perfluorination.

4,041,087

METHOD FOR THE DIRECT PREPARATION OF HALOGENATED HYDROCARBONS BY THE REACTION OF CO, H_2 AND HALOGEN IN THE PRESENCE OF A CATALYST

M. Albert Vannice, Boalsburg, Pa., assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed Aug. 26, 1975, Ser. No. 607,763
Int. Cl.² C07C *19/00, 27/06*
U.S. Cl. 260—652 R **18 Claims**

1. A method for the preparation of halogenated hydrocarbons of the formula $C_AH_{2A+2-B}X_B$ wherein X is a halogen selected from the group consisting of fluorine, chlorine, bromine and iodine, A is an integer ranging from 1 to 4 inclusive and B is an integer ranging from 1 to 10 inclusive, except that $2A+2-B$ may not be less than zero, which method comprises the steps of:

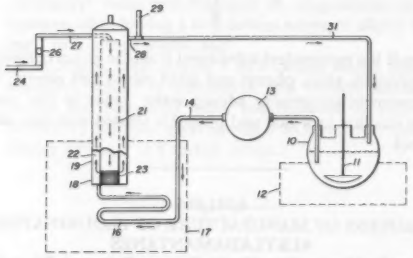
1. preparing a system comprising CO, H_2 and a source of halogen wherein the source of halogen is selected from the group consisting of molecular halogen and hydrogen halides;
2. passing said system over a catalyst metal selected from the group consisting of Group VIII metals, rhenium, and platinum-iridium and platinum-rhenium alloys, which catalyst metal is in combination with an acidic inorganic oxide material;
3. heating the system containing the CO, H_2 and halogen source over the catalyst to a temperature in the range of 200° C – 1000° C; and
4. pressurizing the system to a level in the range of 0.1 atm. to 500 atm.

4,041,088

RECIRCULATION TELOMERIZATION PROCESS AND ITS LIQUID TELOMERS AND LIQUID TELOMERS PRODUCED THEREBY

Ricardo O. Bach, and Robert C. Morrison, both of Gastonia, N.C., assignors to Lithium Corporation of America, Gastonia, N.C.

Filed Nov. 8, 1976, Ser. No. 739,484
Int. Cl.² C07C *15/02*
U.S. Cl. 260—668 B **17 Claims**



1. In a recirculation process of producing normally liquid telogens wherein a telogen is metalated with an organometal initiator in a container and said metalated telogen is then reacted with at least one gaseous taxogen selected from the group of conjugated dienes and vinyl-substituted aromatic compounds, the steps which comprise forming and maintaining a solution of said telogen and said initiator in said container, passing said solution into the reaction zone of a reactor, continuously passing a controlled stream of said gaseous taxogen through fine apertures into said reaction zone of said reactor where it commingles with said solution of the telogen and the initiator to produce a reaction mixture containing normally liquid telomer, returning said reaction mixture to said container to commingle with the solution therein of said telogen and initiator, and recirculating the contents of said container into said reaction zone for further reaction with said gaseous taxogen passing through said fine apertures.

4,041,089

PROCESS FOR THE ISOMERIZATION OF DIMETHYLNAPHTHALENES USING A MORDENITE/ALUMINA CATALYST

John K. Allen, Batavia, Ill., and Ralph J. Bertolacini, Chesterton, Ind., assignors to Standard Oil Company a corporation of Indiana, Chicago, Ill.

Filed June 28, 1976, Ser. No. 700,323
Int. Cl.² C07C *5/24*
U.S. Cl. 260—668 A **11 Claims**

1. A method for isomerization of dimethylnaphthalenes including conversion of a feed containing 1,5-dimethylnaphthalene to 1,6 and 2,6-dimethylnaphthalenes, the process comprising contacting said feed at isomerization conditions with a catalyst consisting essentially of from about 35 to about 45 weight percent of mordenite in the hydrogen form dispersed in a gamma alumina matrix, to effect the production of said 1,6 and 2,6-dimethylnaphthalenes.

4,041,090

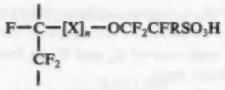
ETHYLBENZENE PROCESS USING AN UNSUPPORTED PERFLUORINATED POLYMER CATALYST

James D. McClure, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Division of Ser. No. 663,897, March 4, 1976. This application Dec. 20, 1976, Ser. No. 752,350
Int. Cl.² C07C *3/52*
U.S. Cl. 260—671 R **3 Claims**

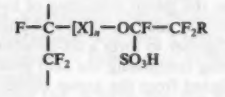
1. A liquid phase process for the preparation of ethylbenzene which comprises contacting an ethylene feed stream with a benzene feed stream at a reaction temperature of between about 125° and about 225° C in the presence of an unsupported solid perfluorinated polymer catalyst wherein said catalyst contains a repeating structure selected from the group of:

a)



or

b)



where n is 0, 1 or 2; R is a radical selected from the group consisting of fluorine and perfluoroalkyl radicals having from 1 to 10 carbon atoms; and X is selected from the group consisting of:

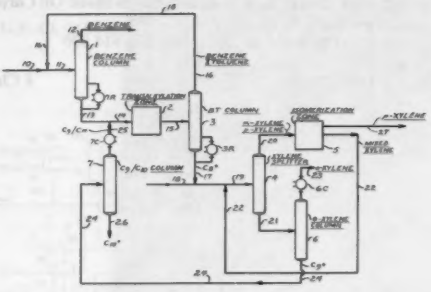
$[O(CF_2)_m]$, $[OCF_2CFY]$ or $[OCFYCF_2]$

where m is an integer from 2 to 10 and Y is a radical selected from the class consisting of fluorine and trifluoromethyl radical.

4,041,091
FRACTIONATION OF AROMATIC STREAMS

Michel Jacques Henry, Brussels, Belgium, assignor to UOP Inc., Des Plaines, Ill.

Filed Feb. 19, 1976, Ser. No. 659,393
Int. Cl.[2] C07C 3/62
U.S. Cl. 260—672 T 5 Claims



1. A combination xylene separation and a toluene transalkylation process, for producing benzene and orthoxylene comprising the steps of:

a. transalkylating a mixture of toluene and C_9 alkylbenzene in a transalkylation zone at transalkylation conditions to produce a transalkylation zone effluent comprising benzene, toluene, C_8 alkylbenzenes, C_9 alkylbenzenes, and C_{10} alkylbenzenes;

b. fractionating at least a portion of said transalkylation zone effluent in a distillation column wherein benzene and toluene are recovered as an overhead fraction and materials heavier than toluene are recovered as a bottoms fraction;

c. fractionating said benzene and toluene fraction in a fractionation column to produce a benzene product and to recover a toluene-rich stream which comprises at least a portion of the charge to the transalkylation zone;

d. passing at least a portion of said bottoms fraction, comprising material heavier than toluene, into a xylene fractionator, and recovering overhead a stream comprising orthoxylene and recovering as a bottoms fraction a stream comprising C_9 and C_{10} alkylbenzenes;

e. passing the C_9 and C_{10} alkylbenzene bottoms fraction to a fractionation zone to recover overhead a stream comprising C_9 alkylbenzenes, at least a portion of which C_9 alkylbenzenes stream is charged to the transalkylation zone;

f. reboiling the column producing benzene product by indirect heat exchange with vapors from the column producing C_9 alkylbenzenes as an overhead fraction; and,

g. reboiling the column producing benzene and toluene as an overhead fraction by indirect heat exchange with a stream comprising orthoxylene vapors obtained as an overhead vapor fraction from the xylene fractionator.

4,041,092
DEHYDROCYCLIZATION WITH AN ACIDIC MULTIMETALLIC CATALYTIC COMPOSITE

George J. Antos, Arlington Heights, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 555,648, March 5, 1975, Pat. No. 3,956,103. This application Apr. 23, 1976, Ser. No. 679,605
The portion of the term of this patent subsequent to May 11, 1993, has been disclaimed.
Int. Cl.[2] C07C 5/22
U.S. Cl. 260—673.5 21 Claims

1. A method for dehydrocyclizing a dehydrocyclizable hydrocarbon comprising contacting the hydrocarbon at dehydrocyclization conditions with an acidic catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum or palladium, about 0.01 to about 2 wt. % rhodium, about 0.01 to about 2 wt. % rhenium and about 0.1 to about 3.5 wt. % halogen; wherein the platinum or palladium, rhodium and rhenium are uniformly dispersed throughout the porous carrier material; wherein substantially all of the platinum or palladium is present in the elemental metallic state; and wherein substantially all of the rhenium and rhodium are present in the elemental metallic state or in a state which is reducible to the elemental metallic state under dehydrocyclization conditions or in a mixture of these states.

4,041,093
METHOD OF DEHYDROGENERATION, DEHYDROCYCLIZATION AND HYDRODEALKYLATION

Viktor Sergeevich Smirnov, Kutuzovsky prospekt, 26, kv. 555; Vladimir Mikhailovich Gryaznov, Leninskie Gory, MG4, Zona I., kv. 11; Valentina Ivanovna Lebedeva, Leninsky prospekt, 48a, kv. 29; Alexandr Petrovich Mischenko, Khersonskaya ulitsa, 7, korpus 4, kv. 115; Victoria Petrovna Polyakova, ulitsa Trofimova, 15, kv. 201, and Evgeny Mikhailovich Savitsky, ulitsa Dm.Ulyanova, DNR-3, kv. 13, all of Moscow, U.S.S.R.

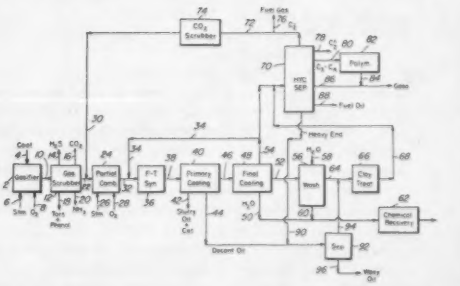
Continuation of Ser. No. 434,224, Jan. 17, 1974, abandoned, which is a division of Ser. No. 271,186, July 12, 1972, Pat. No. 3,865,891, which is a division of Ser. No. 23,037, March 26, 1970, abandoned. This application May 19, 1975, Ser. No. 578,659
Int. Cl.[2] C07C 5/32; B01J 23/64, 35/02
U.S. Cl. 260—673.5 5 Claims

1. A method for the selective preparation of aromatic hydrocarbons by the dehydrocyclization of paraffins, which comprises the passing of a vaporized paraffin hydrocarbon feedstock at a temperature of 300° to 650° C over a catalyst in the form of a foil made of palladium alloyed with at least one member selected from the group consisting of rhenium, tungsten, and a combination of tungsten and ruthenium, the content of palladium in said alloy ranging from 60 to 99 weight percent.

4,041,094
METHOD FOR UPGRADING PRODUCTS OF FISCHER-TROPSCH SYNTHESIS

James C. Kuo, Cherry Hill; Charles Dwight Prater, Pitman, both of N.J., and John J. Wise, Media, Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Sept. 18, 1975, Ser. No. 614,587
Int. Cl.[2] C07C 1/04
U.S. Cl. 260—676 R 4 Claims



1. A method for upgrading Fischer-Tropsch synthesis products boiling below about 560° F which comprises cooling and separating at a temperature of about 100° F a Fischer-Tropsch synthesis product boiling below about 560° F into a gaseous phase, a water phase and a hydrocarbon phase,

water washing said hydrocarbon phase to recover oxygen-

ates and combining the water phase above obtained for chemical processing,

passing said hydrocarbon phase in contact with a crystalline aluminosilicate zeolite conversion catalyst that has a pore size greater than about 5 Angstroms; a silica to alumina ratio of at least 12; and a constraint index within the range of 1 to 12 under temperature conditions selected from within the range of 500° to 950° F and a pressure selected from within the range of 0 to 300 psig to produce a gasoline product of improved octane rating,

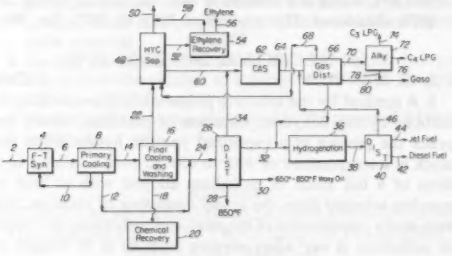
separating the product of said crystalline zeolite conversion operation and said synthesis product gaseous phase under conditions to recover an ethylene rich fraction, a gaseous components fraction suitable for conversion to gasoline boiling materials, a gasoline fraction of improved octane rating, a light fuel oil fraction and a heavier oil fraction.

4,041,095

METHOD FOR UPGRADING C_5 PLUS PRODUCT OF FISCHER-TROPSCH SYNTHESIS

James C. Kuo, Cherry Hill, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Sept. 18, 1975, Ser. No. 614,582
Int. Cl.² C07C 1/04
U.S. Cl. 260—676 R **3 Claims**



1. In a process combination wherein the effluent of a Fischer-Tropsch synthesis operation is cooled and separated to provide a decant oil fraction, a liquid hydrocarbon fraction boiling below said decant oil, a gaseous hydrocarbon fraction and a water fraction, the method for improving the quality of the hydrocarbon fractions thus separated which comprises,

recovery from said liquid hydrocarbon fractions, a first gasoline fraction, a waxy oil fraction boiling up to about 850° F, a fraction boiling above about 850° F and a light oil fraction boiling between said first gasoline fraction and said recovered waxy oil fraction,

hydrogenating said light oil fraction and separating the hydrogenated product thereof to recover a diesel fuel product, a jet fuel boiling product and a lighter fraction boiling below said jet fuel,

separating said gaseous hydrocarbon fraction recovered from the Fischer-Tropsch synthesis effluent under conditions to recover an ethylene rich stream from a stream comprising C_3 to C_6 hydrocarbons, combining said stream comprising C_3 to C_6 hydrocarbons with said separated first gasoline fraction and contacting the thus combined streams with a selective crystalline zeolite conversion catalyst under conditions to substantially raise the octane number of the gasoline charged thereto,

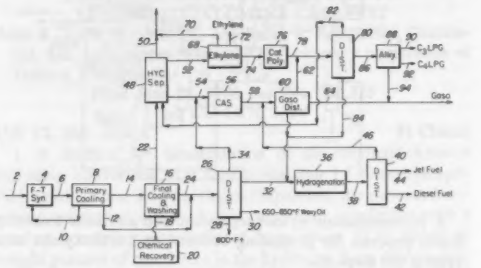
separating the effluent of said crystalline zeolite conversion operation and said lighter fraction separated from said jet fuel under conditions to recover a higher octane gasoline boiling product fraction, a fraction comprising C_3 to C_4 hydrocarbons and a hydrocarbon fraction higher boiling than said higher octane gasoline fraction, passing the thus recovered higher boiling hydrocarbon fraction to said hydrogenation step, alkylating said fraction comprising C_3 to C_4 hydrocarbons to produce LPG product and gasoline boiling product and blending gasoline boiling product of said alkylation operation with said higher octane gasoline product.

4,041,096

METHOD FOR UPGRADING C_5 PLUS PRODUCT OF FISCHER-TROPSCH SYNTHESIS

James C. Kuo, Cherry Hill, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Sept. 18, 1975, Ser. No. 614,590
Int. Cl.² C07C 1/04
U.S. Cl. 260—676 R **4 Claims**



1. In a process combination wherein the effluent of Fischer-Tropsch synthesis is cooled, water washed and separated to provide a decant oil fraction, a liquid hydrocarbon fraction boiling below said decant oil fraction, a gaseous fraction and a water phase, the method for upgrading the hydrocarbon fractions thus recovered which comprises,

combining the decant oil fraction with the lower boiling liquid hydrocarbon fraction and separating the combined fractions under conditions to recover a first gasoline and lower boiling fraction, a light oil fraction, and a heavy waxy oil fraction of an end point of about 850° F, said light oil fraction having an initial boiling point within the range of 325° to 400° F and an end boiling point within the range of 600° to 650° F,

subjecting the light oil fraction to catalytic hydrogenation under conditions to produce upon separation of the product, a diesel fuel product, a jet fuel product and a second gasoline containing fraction comprising lower boiling components,

separating the gaseous fraction recovered from the Fischer-Tropsch synthesis product under conditions to recover an ethylene rich fraction, lower boiling gaseous material, a fraction comprising C_2 to C_4 hydrocarbons and a fraction comprising C_5 and higher boiling materials,

separating said C_2 to C_4 hydrocarbon fraction into an ethylene rich stream and a C_3 and C_4 stream thereafter passed to catalytic polymerization,

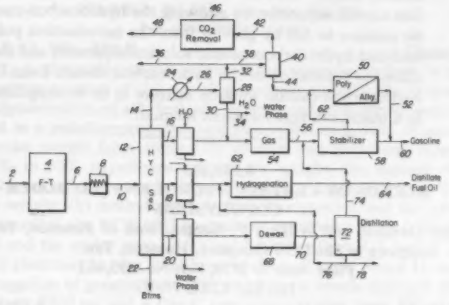
combining said C_5 and higher boiling fraction with said first gasoline and lower boiling fraction above recovered and contacting the thus combined materials wth a crystalline zeolite catalyst under conditions selective for producing a gasoline product of improved octane rating, combining the effluent of the crystalline zeolite catalyst step with the recovered second gasoline fraction and separating the thus combined material to recover a third gasoline product fraction of improved octane rating, a C_4 minus gaseous fraction and product fraction boiling above said third gasoline product fraction,

separating the C_4 minus gaseous fraction above recovered with the product effluent of said catalytic polymerization operation to recover material higher boiling than gasoline, a C_2 minus material fraction and a C_3–C_4 rich stream thereafter passed to catalytic alkylation and blending an alkylate product with said gasoline product of improved octane above recovered.

4,041,097
METHOD FOR ALTERING THE PRODUCT DISTRIBUTION OF FISCHER-TROPSCH SYNTHESIS PRODUCT

Henry R. Ireland, Woodbury, and Thomas R. Stein, Cherry Hill, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Sept. 18, 1975, Ser. No. 614,588
Int. Cl.[2] C07C *1/04*
U.S. Cl. 260—676 R 8 Claims



1. A method for upgrading the products of Fischer-Tropsch synthesis which comprises,

separating the product effluent of Fischer-Tropsch synthesis into a gaseous fraction comprising C_5 and lower boiling components, a C_5 plus gasoline fraction, a light oil fraction boiling in the range extending from said gasoline fraction up to about 600° F, and a high boiling waxy fraction,

cooling said gaseous fraction under conditions to separate and recover a water phase from a gaseous hydrocarbon phase comprising C_5 and lower boiling gaseous components,

separating the gaseous hydrocarbon phase to recover a fraction rich in C_2 to C_5 hydrocarbons thereafter catalytically converted to gasoline boiling range components,

passing C_5 plus gasoline boiling material in contact with a crystalline zeolite conversion catalyst selective for producing a gasoline product of improved octane rating and separating the gasoline of improved octane rating from lower boiling gaseous material,

passing the separated high boiling waxy fraction in contact with a hydrodewaxing catalyst selective for producing a dewaxed light oil fraction and a gasoline fraction of relatively high octane rating subsequently separated from one another,

combining the dewaxed light oil fraction produced above with said separated light oil product of Fischer-Tropsch snythesis and passing the combined light oil material in contact with a hydrogenation catalyst maintained under hydrogenating conditions, recovering a hydrogenated light oil product and

recovering the gasoline products of the improving combination.

4,041,098
METHOD FOR THE OLIGOMERIZATION OF ALPHA-OLEFINS

Frederick C. Loveless, Cheshire, Conn., assignor to Uniroyal, Inc., New York, N.Y.

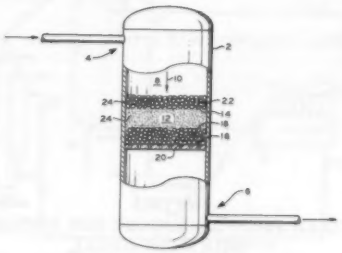
Continuation-in-part of Ser. No. 484,836, July 1, 1975, abandoned. This application Nov. 17, 1975, Ser. No. 632,342
Int. Cl.[2] C07C *3/10*; B01J *31/12*
U.S. Cl. 260—683.15 D 9 Claims

1. A method of oligomerizing straight chain alpha olefins having at least 3 carbon atoms comprising, generating in situ a soluble catalyst system by simultaneously adding with stirring to a reactor having an inert atmosphere and a temperature up to 200° C., a first feed comprising a straight chain alpha-olefin monomer having at least 3 carbon atoms and a minor amount of a soluble aluminum alkyl halide and a second feed comprising a straight chain alpha-olefin monomer having at least three carbon atoms and a minor amount of a soluble organic halide; wherein said soluble aluminum alkyl halide compound is selected from the group consisting of ethyl aluminum sesquichloride, ethyl aluminum dichloride and diethyl aluminum chloride, and said soluble organic halide is selected from the group consisting of a primary, secondary or tertiary aliphatic halide, an allylic halide or a benzylic halide, said soluble organic halide possessing; (a) at least one halogen-bearing carbon atom in the molecule and (b) not more than one halogen atom attached to any single carbon atom in said molecule; said aluminum alkyl halide being present in said catalyst system in an amount of at least about 0.1% by weight of the total monomer content and in sufficient amount to provide a total Hal/Al ratio in said catalyst system of at least about 2.5/1.

4,041,099
PARAFFIN DEHYDROGENATION USING PLATINUM-TIN PROMOTED ZINC ALUMINATE CATALYST AND SILICA-FREE PARTICLES

Thomas Hutson, Jr., Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 216,100, Jan. 7, 1972, Pat. No. 4,005,985. This application Sept. 3, 1976, Ser. No. 720,317
Int. Cl.[2] C07C *5/36*
U.S. Cl. 260—683.3 3 Claims



1. A process for dehydrogenating a hydrocarbon feedstock comprising alkanes, cycloalkanes, arylalkanes or mixtures thereof in which the feedstock is dehydrogenated in contact with a layer of platinum-tin promoted zinc aluminate catalyst, said process comprising maintaining a first and a second layer of silica-free particles with the catalyst layer arranged between these layers of silica-free particles and passing the feed stream through one of said first and second layers of silica-free particles and thereafter through the catalyst layer.

4,041,100
CATALYTIC ALKYLATION UTILIZING OLEFINIC, CONJUGATED CYCLIC HYDROCARBONS AS PROMOTER THEREIN

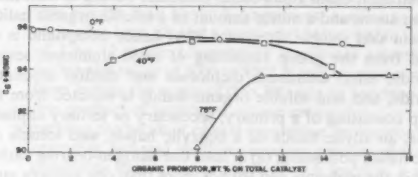
William C. Behrmann; Earl E. Turner, both of Baton Rouge, La., and Victor C. Bastron, Seabrook, Tex., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Dec. 19, 1975, Ser. No. 642,539
Int. Cl.[2] C07C *3/54*
U.S. Cl. 260—683.47 16 Claims

1. In an alkylation process which comprises contacting a paraffin with an olefin at alkylation conditions and in the presence of an organic promoter comprising olefinic conjugated cyclic hydrocarbons and an alkylation catalyst comprising a strong acid catalyst selected from the group consisting of halosulfuric acid, trihalomethanesulfonic acid and mixtures thereof, the improvement which comprises the steps of:

1. effecting substantially the entire alkylation at a tempera-

ture from above about 0° F. to about 120° F by adding to the alkylation at least 4 to about 20 wt. %, based on total catalyst, of said organic promoter and



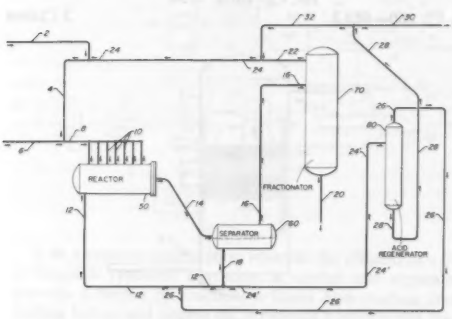
2. recovering from step (1) an alkylate of enhanced product quality relative to that obtained when said alkylation is effected outside the conditons set forth in step (1).

4,041,101

HF ALKYLATION PROCESS WITH ADDITION OF ACID REGENERATOR BOTTOMS TO THE RECYCLE ISOPARAFFIN STREAM

Jay E. Sobel, Highland Park, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Dec. 3, 1975, Ser. No. 637,444
Int. Cl.² C07C 3/54
U.S. Cl. 260—683.51 **4 Claims**



1. In a process for alkylating an olefin with an isoparaffin in the presence of HF acid catalyst in a reaction zone wherein the amount of isoparaffin is in excess of that required to react with the olefin, unreacted isoparaffin is recovered by fractionation from alkylate product, at least a portion of unreacted isoparaffin is recycled to the reaction zone, and wherein there is present in the recycle isoparaffin stream a HF acid of high activity and wherein at least a portion of the HF acid catalyst used in the reaction zone is removed from the process for regeneration in a HF acid regenerator fractionator and a stream of organic diluent is recovered as a bottoms fraction from said fractionator, the improvement comprising addition at least a portion of said organic diluent to the recycle isoparaffin stream thereby attenuating the activity of the HF acid contained in the recycle isoparaffin.

4,041,102

CAUSTIC TREATMENT OF ALKYLATE-CONTAINING HYDROCARBON

John A. Wronka, Pennsauken, N.J., assignor to Cities Service Company, Tulsa, Okla.

Filed Sept. 12, 1975, Ser. No. 613,007
Int. Cl.² C07C 3/54
U.S. Cl. 260—683.62 **3 Claims**

1. In a continuous process for treating an alkylate-containing hydrocarbon phase exiting from an anionic surfactant-promoted, sulfuric acid-catalyzed alkylation unit, wherein the hydrocarbon phase contains said alkylate, unreacted isoparaffin, traces of the sulfuric acid alkylation catalyst and doecylbenzenesulfonic acid alkylation promotor, the improvement comprising,

a. mixing said hydrocarbon stream with a water caustic solution, having at least 15% by wt. concentration of caustic, such that the salt of the promotor appears as a flocculent precipitate at the hydrocarbon-caustic interface in a hydrocarbon-caustic separator, and (b) introducing the hydrocarbon-caustic mixture into a hydrocarbon-caustic solution separator at a position above said hydrocarbon-caustic solution interface within said hydrocarbon-caustic separator, by allowing the hydrocarbon-caustic mixture to fall by gravity from the introduction point into said hydrocarbon-caustic solution separator, and thus allowing separation of the hydrocarbon stream from the hydrocarbon-caustic solution mixture to be accomplished in a quiescent, non-turbulent manner.

4,041,103

BLENDS OF CERTAIN HYDROGENATED BLOCK COPOLYMERS

Sol Davison, and William P. Gergen, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

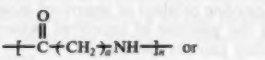
Filed June 7, 1976, Ser. No. 693,462
Int. Cl.² C08L 77/00
U.S. Cl. 260—857 D **8 Claims**

1. A composition comprising the admixture obtained by intimately mixing 100 parts by weight of a block copolymer and about 5 to about 200 parts by weight of a polyamide so as to form an interpenetrating network wherein:

a. said block copolymer comprises at least two monoalkenyl arene polymer end blocks A and at least one substantially completely hydrogenated conjugated diene polymer midblock B, said block copolymer having an 8 to 55 percent by weight monoalkenyl arene polymer block content, each polymer block A having an average molecular weight of between about 5,000 and about 125,000, and each polymer block B having an average molecular weight of between about 10,000 and about 300,000; and

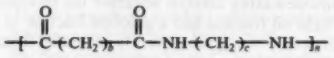
b. said polyamide has the formula:

I



or

II



where *a* or *b* or *c* individually vary from 4 to 12 inclusive, and n is chosen so that the number average molecular weight is between about 10,000 and about 30,000.

4,041,104

HIGH IMPACT CORROSION RESISTANT POLYMERS

Jeffrey E. Selley, East Amherst, N.Y., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed Aug. 29, 1975, Ser. No. 608,931
Int. Cl.² C08L 75/00
U.S. Cl. 260—859 R **13 Claims**

1. A polymerizable composition comprising (A) a vinyl monomer, present in an amount of about 30 to 50 weight percent; and (B) a prepolymer blend, present in an amount of about 50 to 70 weight percent, obtained by the steps of (a) reacting an organic dissocyanate and a hydroxyl-terminated polydiene in a molar ratio of about 0.01 to about 0.2 moles of polydiene per mole of diisocyanate, wherein greater than 75% of the unsaturation present in said polydiene is of the 1,4-type and less than 25% of the unsaturation present is of the 1,2-type, ane (b) reacting the product of step (a) with a hydroxyalkyl

acrylate in a molar ratio of about 1.5 to about 2.0 moles per mole of said diisocyanate.

4,041,105

POLYURETHANE ELASTOMER DERIVED FROM GRAFT OF ETHYLENICALLY UNSATURATED MONOMER ON POLYALKYLENE ETHER GLYCOL

Francis X. O'Shea, Naugatuck, and Chung-Ling Mao, Sandy Hook, both of Conn., assignors to Uniroyal, Inc., New York, N.Y.

Filed Feb. 26, 1976, Ser. No. 661,595
Int. Cl.[2] C08H *75/00*
U.S. Cl. 260—859 R **5 Claims**

1. A thermally stable polyurethane elastomer which is a reaction product of: (a) a graft polyol prepared by the in situ polymerization of ethylenically unsaturated monomeric material in a poly(oxypropylene)-poly(oxyethylene)glycol of molecular weight from about 1750 to 4000 and containing from 30% to 50% oxyethylene groups by weight, the amount of polymerized monomer in the graft polyol being from 5 to 50 % by weight; (b) methylenebis(4-phenylisocyanate); and (c) 1,4-butanediol; the NCO/OH equivalents ratio being from 0.95 to 1.2 and the molar ratio of (c) and (a) being from 4/1 to 12/1; said elastomer having a hardness of about 40 to 55 Shore D, an elongation of greater than 30%, an ultimate tensile strength of at least 2500 psi and a Die C tear strength of at least 500 pli, said elastomer displaying improved thermal stability as evidenced by its ability to retain at least twice as much of its original tensile strength, after exposure to a temperature of 415° F. for twenty minutes, as an otherwise similar elastomer in which (a) contains 10% or less of oxyethylene groups.

4,041,106

VINYL CHLORIDE POLYMER COMPOSITION MODIFIED FOR TRANSPARENCY, IMPACT AND THERMAL RESISTANCE

Fumio Ide; Kazuo Kishida, and Norihisa Osaka, all of Otake, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Filed May 11, 1976, Ser. No. 685,145
Claims priority, application Japan, May 15, 1975, 50-58389
Int. Cl.[2] A43B *13/04*; C08L *51/06*; C08F *6/24*
U.S. Cl. 260—876 R **6 Claims**

1. A thermoplastic vinyl chloride polymer composition comprising a blend of:

I. 61 to 85 parts by weight of polyvinyl chloride and/or a copolymer comprised of no less than 80% by weight of vinyl chloride and no more than 20% by weight of at least one other copolymerizable monoethylenically unsaturated monomer, and;

II. 15 to 39 parts by weight of a composite elastomer composition consisting essentially of:

A. 20 to 60% by weight, based on the weight of the composite elastomer composition, of a graft copolymer consisting of (a) 15 to 45% by weight of graft monomers consisting of 30 to 70% by weight of methyl methacrylate and 30 to 70% by weight of styrene and (b) 55 to 85% by weight of a butadiene rubber, said graft copolymer being prepared by a sequential polymerization procedure of at least two stages, wherein during the first stage at least part of the methyl methacrylate is polymerized in the presence of a latex of said butadiene rubber, said butadiene rubber particles dispersed therein having an average particle size of 0.10 to 0.30 micron and a refractive index of 1.530 to 1.550 was determined at 20° C, and then, in a subsequent sequential stage or stages, which can be carried out in any order, the first polymerizate is separately polymerized with styrene and separately polymerized with the remainder of the methyl methacrylate, if any, and

B. 40 to 80% by weight, based on the weight of the composite elastomer composition, of a copolymer consisting of 35 to 65% by weight of α-methylstyrene, 10 to 60% by weight of methyl methacrylate, 5 to 35% by weight of acrylonitrile and 0 to 10% by weight of at least one other copolymerizable monoethylenically unsaturated monomer.

4,041,107

THERMALLY STABLE POLYPHOSPHONATES AS FLAME RETARDANTS

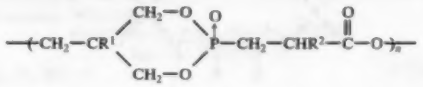
James S. Clovis, and Francis R. Sullivan, both of Warminster, Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Division of Ser. No. 139,948, May 3, 1971, Pat. No. 3,755,270.
This application May 29, 1973, Ser. No. 364,838
Int. Cl.[2] C08F *259/00, 275/00*
U.S. Cl. 260—876 R **5 Claims**

1. As an article of manufacture, an acrylic composition comprising an addition polymer formed by polymerizing a mixture comprising:

a. at least 50 weight percent of methyl methacrylate; and

b. 5 to 30 weight percent of a flame-resistant phosphonate polymer defined by the general formula



wherein R^1 is methyl or ethyl, R^2 is hydrogen or methyl and n is 3 to 100.

4,041,108

PROCESS FOR PRODUCING VINYL GRAFT COPOLYMER RESIN

Fusaji Shoji; Hiroyoshi Kokaku; Hisashi Kohkame, and Koiti Kakefuda, all of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed Mar. 14, 1975, Ser. No. 558,373
Claims priority, application Japan, Mar. 20, 1974, 49-30950
Int. Cl.[2] C08L *33/08*
U.S. Cl. 260—881 **19 Claims**

1. A process for producing a vinyl graft copolymer resin by graft copolymerization of a cross-linked acrylic rubber obtained from an acrylic acid ester having the general formula:

$$CH_2 = CH - COOR$$

wherein R is an alkyl group having 2 – 8 carbon atoms, and a polymerizable vinyl monomer which comprises agglomerating acrylic rubber particles by stirring a mixture of 5 to 50 parts by weight (solid rubber basis) of an aqueous latex of the acrylic rubber and 95 to 50 parts by weight of the vinyl monomer consisting essentially of a polymerizable aromatic vinyl monomer in the presence of a coagulating agent to form an aqueous emulsion, the particle size of the acrylic rubber particle agglomerates being adjusted to a range 0.2 to 10λ, initiating graft polymerization by emulsion polymerization of the acrylic rubber particle agglomerates and the vinyl monomer in the presence of a free radical initiator, adding a surface active agent during the emulsion polymerization, continuing the emulsion polymerization until demulsification occurs while the particle size of the agglomerates of the acrylic rubber particles and grafted acrylic rubber particles is adjusted to a range of 0.2 to 10λ, and then completing the graft polymerization by suspension polymerization.

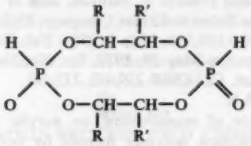
4,041,109
DIPHOSPHOROUS

Jean Abblard, St. Didier au Mont d'Or; Georges Marmain, Fontaine sur Seine, and Andrée Viricel, Lyon, all of France, assignors to Philagro, France

Filed Mar. 24, 1975, Ser. No. 561,220
Claims priority, application France, Mar. 22, 1974, 74.10988
Int. Cl.[2] C07F 9/21; A01N 9/36
U.S. Cl. 260—927 R 3 Claims

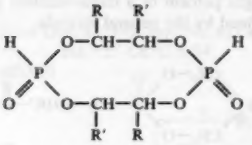
1. Isomeric cyclic diphosphorous compounds of the following formulae:

(I)



and

(II)



wherein

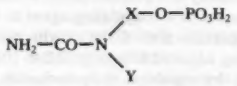
R and R′ are hydrogen, but cannot both be hydrogen; alkyl radicals containing 1 to 5 carbon atoms; and halogenated alkyl radicals of 1–5 carbon atoms; and mixtures thereof.

4,041,110
MONOPHOSPHORIC ACID ESTERS OF HYDROXY ALKYL UREA COMPOUNDS

Friedrich Krüeger, Edingen, and Güenter Schmidt, Ludwigshafen, both of Germany, assignors to Joh. A. Benckiser GmbH, Ludwigshafen (Rhine), Germany

Filed Nov. 7, 1975, Ser. No. 629,755
Claims priority, application Germany, Nov. 8, 1974, 2453037
Int. Cl.[2] C07F 9/141; C02B 5/06
U.S. Cl. 260—938 4 Claims

1. A phosphoric acid ester of a hydroxy alkyl urea compound of the formula



in which

X is a member selected from the group consisting of lower alkyl with 2 to 6 carbon atoms and lower alkoxy lower alkyl with 2 to 6 carbon atoms, while

Y is a member selected from the group consisting of hydrogen and the —X—O—PO_3H_2 group or the water soluble salts thereof.

4,041,111
PHOSPHONATE MONOESTERS AND METHOD OF PREPARATION

Susan J. Kelly, Lafayette, and Larry G. Butler, West Lafayette, both of Ind., assignors to Purdue Research Foundation, West Lafayette, Ind.

Filed Mar. 4, 1975, Ser. No. 555,097
Int. Cl.[2] C07F 9/40
U.S. Cl. 260—954 6 Claims

1. A substrate for phosphodiesterase enzymes, said substrate being a biologically active phosphonate monoester that is hydrolized by said phosphodiesterase enzymes with said phosphonate monoester being selected from the group consisting of 4-nitrophenyl phenylphosphonate, 2-naphthyl phenylphosphonate, 4-nitrophenyl cyclohexylphosphonate, 2-naphthyl cyclohexylphosphonate, 4-nitrophenyl 1-propylphosphonate, 2-naphthyl 1-propylphosphonate, 4-nitrophenyl 2-propylphosphonate, 2-naphthyl 2-propylphosphonate, 4-nitrophenyl chloromethylphosphonate, 2-naphthyl chloromethylphosphonate, and 2-naphthyl methylphosphonate.

2. A method for synthesising phosphonate monoesters, said method comprising:

providing a phosphonic acid dichloride capable of being reacted to form a monoester monochloride in an aromatic solvent;

adding dimethylformamide in an amount up to about twice that of said phosphonic acid dichloride to said phosphonic acid dichloride in said aromatic solvent to prevent formation of diester;

adding 2-naphthol or 4-nitrophenol in an amount up to about three times that of said phosphonic acid dichloride after the additiion of said dimethylformamide so that an interaction occurs with said phosphonic acid dichloride to displace chloride therefrom and form a monoester monochloride;

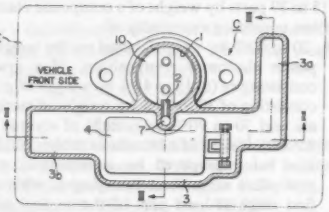
hydrolyzing the monochloride and any remaining dichloride; and

separating the monoester from the free phosphonic acid.

4,041,112
CARBURETOR FOR VEHICLE ENGINES

Akihisa Nakamura, Ohizumigakuen; Takashi Kamezaki, Tokyo; Kenji Naito, Kawasaki, and Kunichika Usui, Asaka, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 28, 1976, Ser. No. 681,268
Claims priority, application Japan, Apr. 28, 1975, 50-50640
Int. Cl.[2] F02M 5/14
U.S. Cl. 261—72 R 3 Claims



1. A carburetor for vehicle engines comprising a suction duct, a single float chamber disposed adjacent one side of the suction duct, a vertically arranged main fuel passage opening into said float chamber, a main fuel nozzle communicating with said fuel passage and opening into the suction duct, and a single float member arranged to float on the surface of fuel in said float chamber for regulating the fuel therein at a constant level, said float chamber having one longitudinal end portion bent toward the adjacent side of said suction duct to project transversely beyond said main fuel nozzle so as to form a lateral extension, and another end portion elongated in the longitudinal direction to compensate for the increased volume of said

lateral extension, so that front and rear halves of said chamber divided by a transversely extending vertical plane passing through the vertical axis of said main fuel passage are substantially equal in effective volume to each other, the lateral halves of said chamber divided by a longitudinally extending vertical plane passing through the vertical axis of said main fuel nozzle being substantially equal in effective volume to each other whereby a substantially constant level of fuel can be maintained in said main fuel passage during acceleration, deceleration, or turning of the vehicle.

4,041,113

TOWER PACKING ELEMENTS

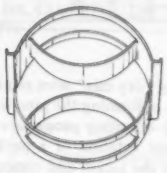
Kevin Joseph McKeown, Windermere Westmoreland, England, assignor to Mass Transfer Limited, Kendal, England

Continuation of Ser. No. 474,322, May 29, 1974, abandoned. This application July 2, 1976, Ser. No. 702,008

Claims priority, application United Kingdom, May 30, 1973, 25791/73; Aug. 31, 1973, 41146/73

Int. Cl.² B01F *3/04*

U.S. Cl. 261—98 **5 Claims**



1. Fluid-fluid contact apparatus comprising a packed bed and means for introducing fluids to said bed for contact therein in which at least a part of the bed is a dumped bed formed of packing elements each comprising a tubular member of given diameter and width having two strip portions oppositely curved with respect to a diametric symmetry plane, the ratio of the diameter of said tubular member to its width being from 2:1 – 5:1, each of said strip portions being on opposite sides of a parting plane which extends perpendicular to said symmetry plane and divides said tubular member into two equal sections, and wherein each of said strip portions includes a single additional strip portion having no free ends and being oppositely curved with respect thereto as well as oppositely curved with respect to each other, said additional strip portions extending inwardly from the inside wall of said tubular member leaving apertures therein and providing protrusions which prevent nesting of said packing elements and thus facilitate, in cooperation with said diameter to width ratio, a generally horizontal alignment of said elements with respect to one another in said bed.

4,041,114

INDENT DUPLICATING PROCESS

George Johannus Yevick, Leonia, N.J., assignor to Personal Communications, Inc., Stamford, Conn.

Filed July 3, 1975, Ser. No. 592,723

Int. Cl.² B29D *11/00*

U.S. Cl. 264—1 **3 Claims**

1. A method of making microfiche elements including the steps of,

a. forming a microfiche blank of a generally transparent sheet,

b. forming a block having a relief surface defined by nodules, the nodule distribution corresponding to a plurality of information sets, each information set corresponding to a unique macro scene, each information set occupying dispersed areas interlaced with but distinct from the dispersed areas occupied by any other informaion set,

c. pressing said relief surface onto one surface of said sheet to selectively indent portions thereof and thus form dimples in the sheet corresponding to the raised portions of said relief surface,

d. forming the other surface of said generally transparent sheet so that it has a plurality of integral lenses, the lenses being related to the dimples such that each sub-set of dimples which corresponds to each macro scene is in optical alignment with a unique sub-set of integral lenses,

e. whereby the dimpled portions of the transparent sheet correspond to a plurality of macro scenes.

4,041,115

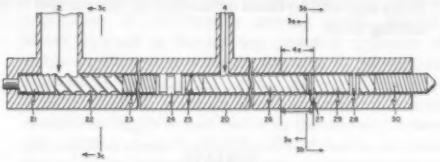
CONTINUOUS PROCESS FOR PREPARING PARTICULATE MICROPOROUS, OPEN-CELLED POLYMER STRUCTURES IN A SCREW-TYPE EXTRUDER

Francis Edward Jenkins, and Daniel Gregory Tynan, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 12, 1975, Ser. No. 576,632

Int. Cl.² B29D *27/00*

U.S. Cl. 264—5 **1 Claim**



1. A continuous process for preparing particulate, microporous, open-celled polymer structures comprising

i. continuously feeding about 5 to 50 parts by weight of a normally solid organic polymer having a glass transition temperature or a crystalline melting point of at least 293° K, and about 95 to 50 parts by weight of a chlorofluorocarbon or a mixture of chlorofluorocarbons having a boiling point in the range of about 10° to 150° C, a melting point in the range of about −40° to 125° C, an entropy of fusion of less than 10 calories/°K/mole, a plastic flow index of at least 0.1 g/10 minutes at the reduced temperature of 0.96 to 0.99 and a solubility in water of less than 2 weight percent to a screw-type extruder having first and second temperature zones,

ii. nonrandomly milling said polymer and said chlorofluorocarbon in said first zone at a temperature equal to or above the melting point of the highest melting chlorofluorocarbon present to provide a solution of the polymer in the chlorofluorocarbon,

iii. passing said solution to said second zone and nonrandomly milling said solution and cooling said solution to a temperature equal to or below the solidification temperature of the lowest melting chlorofluorocarbon present to form a frozen mass,

iv. extruding said frozen mass from said second zone as an uncompacted snow-like mass, and

v. removing the chlorofluorocarbon from said snow-like mass at a temperature equal to or below the solidification temperature of the lowest melting chlorofluorocarbon present to form said particulate, microporous, open-celled polymer structures.

4,041,116
METHOD FOR THE MANUFACTURE OF CARBON-CARBON COMPOSITES

Michael F. Baud, Elizabethton, Tenn., and Jay A. Harvey, East Amherst, N.Y., assignors to Great Lakes Carbon Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 360,469, May 15, 1973, abandoned. This application July 15, 1974, Ser. No. 488,566
Int. Cl.[2] C04B *43/02*
U.S. Cl. 264—29.5 8 Claims

1. A method for the manufacture of carbon mats consisting of carbon from about 20 to about 96 weight percent from carbon fiber, from 0 to about 72 weight percent from a carbonaceous flour, and from about 3 to about 15 weight percent from a carbonized resin which consists in:

a. combining the appropriate quantities of carbon fibers of from 0.01 to 0.05 inches in length, a thermosetting resin and solvent therefor, and a carbonaceous flour so that the liquid to solid weight ratio is from about 50:1 to about 30:1, and the solvent to resin ratio is about 6:1 to about 20:1;

b. allowing the solids to settle to equilibrium height in the liquid;

c. pressing the settled solids at up to about 100 psi and removing the excess liquid therefrom by vacuum;

d. heating the resulting mat to a sufficient temperature to cure the resin; and

e. carbonizing the resulting mat by heating to a temperature between about 1000° C. to about 2800° C., to form a mat wherein the fibers are oriented randomly in the plane perpendicular to the direction of force used to settle the fibers and with no fibers oriented in the axis parallel to the settling force.

4,041,117
SILICON CARBIDE SINTERED BODY

Svante Prochazka, Ballston Lake, N.Y., assignor to General Electric Company, Schenectady, N.Y.

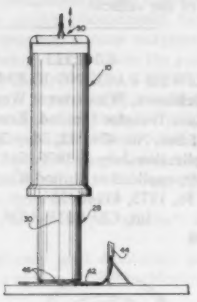
Division of Ser. No. 591,840, June 30, 1975, abandoned. This application June 21, 1976, Ser. No. 698,483
Int. Cl.[2] C04B *35/56, 35/64*
U.S. Cl. 264—63 2 Claims

1. A method of producing a silicon carbide sintered body having temperature-resistant properties which comprises providing a substantially homogeneous submicron particulate mixture consisting essentially of silicon carbide composed of β-SiC and from 0.05% to 5% by weight of α-SiC based on said β-SiC, said β-SiC particles having an average particle size ranging up to 0.45 micron and said α-SiC particles having a particle size of at least about twice as large as that of said β-SiC particles, an amount of boron additive selected from the group consisting of boron and boron carbide equivalent to 0.3% to 3.0% by weight of boron based on the total amount of silicon carbide, and an amount of a carbonaceous additive selected from the group consisting of free carbon and a carbonaceous organic material equivalent to 0.1% to 1.0% by weight of free carbon based on the total amount of silicon carbide, said carbonaceous organic material completely decomposing at a temperature ranging from about 50° C to 1000° C to said free carbon and gaseous products of decomposition, shaping the mixture into a green body, and sintering the green body at a temperature ranging from about 1950° C to 2300° C in an atmosphere in which it is substantially inert at atmospheric pressure or below atmospheric pressure to produce a sintered body having a density of at least 80% of the theoretical density for silicon carbide and containing α-SiC in an amount of at least 70% by weight of the total amount of silicon carbide.

4,041,118
METHOD AND APPARATUS FOR MAKING CONCRETE PIPE

Norman Ottmann, Simsbury, and Walter Strever, Cromwell, both of Conn., assignors to Atlantic Pipe Corporation, Plainville, Conn.

Filed Feb. 5, 1975, Ser. No. 547,333
Int. Cl.[2] B28B *1/10, 21/14, 21/18, 21/28*
U.S. Cl. 264—71 4 Claims

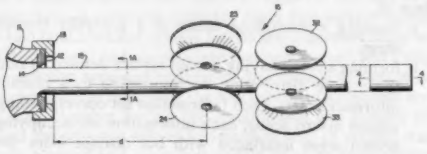


4. A method for making "dry mix" wire reinforced concrete pipe comprising the steps of forming the pipe within a cylindrical upstanding jacket by effecting progressive axial upward movement and concurrent rotation of a packerhead from a lower to an upper end of the jacket and concurrently feeding mix onto an upper surface of the packerhead, the packerhead in turn distributing the mix radially outwardly about and between its periphery and the jacket to form the pipe, providing a radially expandable and contractable cylinder at least as long as the pipe and having an external diameter approximating the pipe internal diameter, effecting relative axial movement between the pipe and cylinder whereby the pipe and jacket are disposed about the cylinder with the latter in a contracted condition, expanding the cylinder into engagement with and throughout the length of the internal surface of the pipe, vibrating the pipe while maintaining expansion pressure on the cylinder whereby to compact, reduce the length, eliminate voids and relieve residual forming stresses in the pipe and in its wire reinforcement, terminating vibration and contracting the cylinder, effecting relative axial movement between the pipe and cylinder whereby to separate the same, effecting at least one additional upward rotary pass of a packerhead through the pipe, feeding mix onto the upper surface of the packerhead during said additional pass to re-establish the desired pipe internal diameter, to finish the internal pipe surface, and to fill the void created at the upper end of the pipe by the aforesaid length reduction, and curing the pipe.

4,041,119
METHOD FOR PRODUCING VARIEGATED SOAP

Charles F. Fischer, Jersey City, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed July 16, 1975, Ser. No. 596,299
Int. Cl.[2] B29F *3/12*
U.S. Cl. 264—75 2 Claims



1. A method of producing variegated soap bars having con-

toured striations comprising the steps of continually extruding a striated soap column from a plodder nozzle, peripherally gripping said moving column at a region located a predetermined distance forwardly of said nozzle and there applying a predetermined torque for twisting the column about its longitudinal axis through a predetermined angle relative to its direction of movement from said nozzle while permitting substantially unimpeded longitudinal movement of said extruding column, and then subdividing the twisted column into blanks and pressing the blanks into soap bars exhibiting the desired contour striations.

4,041,120

PROCESS FOR PRODUCING A SYNTHETIC RESIN ARTICLE HAVING IMPROVED RESISTANCE TO SURFACE ABRASION

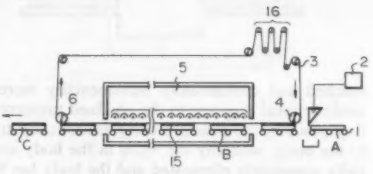
Akira Oshima; Keisuke Yoshihara; Mikio Shiki, and Tuneo Ikeda, all of Otake, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Division of Ser. No. 212,047, Dec. 27, 1971, abandoned. This application May 28, 1974, Ser. No. 473,910

Claims priority, application Japan, Dec. 28, 1970, 46-119373

Int. Cl.[2] B29D *7/08, 7/14, 9/00*

U.S. Cl. 264—171 **10 Claims**



1. In a process for producing a synthetic resin article having a synthetic resin surface layer firmly adhered to a resin and having greatly improved resistance to surface abrasion; said process comprising the steps of:

a. spreading onto all or part of the inner surface of a mold member a polymerizable material selected from the group consisting of (i) a compound having a total of at least three acryloxy ($CH_2=CH\cdot CO\cdot O$-) and/or methacryloxy ($CH_2=C(CH_3)\cdot CO\cdot O$-) groups in the molecule, (ii) a monomer mixture comprising at least 40% by weight of said compound and at most 60% by weight of other copolymerizable ethylenically unsaturated monomer and (iii) a partially polymerized product of said compound or of said monomer mixture,

b. adhering a preformed film having little or no affinity for said polymerizable material closely to the spread surface,

c. polymerizing said polymerizable material to an extent such that the polymerized material can not be swollen with or dissolved into a monomer for the base resin to be charged into said mold member,

d. removing the film from the polymerized material,

e. charging a mixture of the monomer for the base resin and a polymerization initiator into the mold,

f. polymerizing the monomer, and

g. after the completion of polymerization, releasing the cast article from the mold, the improvement comprising upstream of a polymerization zone wherein said polymerizable material is polymerized while passing therethrough, coating said polymerizable material onto the surface of at least one of two horizontal upper and lower endless belts continuously traveling at the same speed and in the same direction and applying a continuous length of said film onto the polymerizable material on the continuously traveling endless belts whereby said length of film is closely adhered onto the coated polymerizable material; downstream of the polymerization zone, continuously removing said length of film from the polymerized material on said endless belts; and continuously charging said monomer mixture for the base resin into an upstream end of a casting space defined by the two opposed,, horizontal upper and lower polymerized material-coated belt surfaces and side seals.

9. In a process for producing a synthetic resin article having a synthetic resin surface layer firmly adhered to a resin and having greatly improved resistance to surface abrasion; said process comprising the steps of:

a. spreading onto all or part of the inner surface of a mold member a polymerizable material selected from the group consisting of (i) a compound having a total of at least three acryloxy ($CH_2=CH\cdot CO\cdot O$—) and/or methacryloxy ($CH_2=C(CH_3)\cdot CO\cdot O$—) groups in the molecule, (ii) a monomer mixture comprising at least 40% by weight of said compound and at most 60% by weight of other copolymerizable ethylenially unsaturated monomer and (iii) a partially polymerized product of said compound or of said monomer mixture,

b. adhering a preformed film having little or no affinity for said polymerizable material closely to the spread surface,

c. polymerizing said polymerizable material to an extent such that the polymerized material can not be swollen with or dissolved into a monomer for the base resin to be charged into said mold member,

d. removing the film from the polymerized material,

e. charging a mixture of the monomer for the base resin and a polymerization initiator into the mold,

f. polymerizing the monomer, and

g. after the completion of polymerization, releasing the cast article from the mold, the improvement comprising coating said polymerizable material onto each upper surface of a plurality of continuously moving molds, aligned at stated intervals in the moving direction upstream of a polymerization zone wherein the coated polymerizable material is polymerized while passing therethrough, closely adhering, upstream of said polymerization zone a continuous length of said film onto the coated polymerizable material coated on the plurality of molds; and, downstream of the polymerization zone, continuously removing said film from the polymerized material.

4,041,121

METHOD FOR MAKING HIGH FLUID-HOLDING FIBER MASS

Frederick R. Smith, Wilmington, Del., assignor to Avtex Fibers Inc., Valley Forge, Pa.

Continuation-in-part of Ser. No. 309,290, Nov. 24, 1972, abandoned. This application Oct. 24, 1975, Ser. No. 625,445

The portion of the term of this patent subsequent to Nov. 11, 1992, has been disclaimed.

Int. Cl.[2] D01F *2/08*

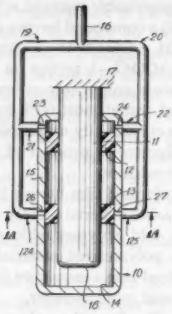
U.S. Cl. 264—191 **2 Claims**

1. A method of making fluid absorbent alloy fibers comprising mixing an aqueous solution of polyvinylpyrrolidone with a filament-forming viscose, said polyvinylpyrrolidone have an average molecular weight of from about 100,000 and 400,000 and a K-value of from 50 to 100 and being present in an amount less than, but at least 6% of, the weight of the cellulose in the viscose, shaping the mixture into fibers, coagulating and regenerating the shaped fibers of regenerated cellulose containing said polyvinylpyrrolidone dispersed therein, and thereafter drying the fibers, said shaping, coagulating and regenerating being effected by extruding the viscose mixture through a spinnerette into a spinning bath comprising sulfuric acid, sodium sulfate and zinc sulfate, said polyvinylpyrrolidone being present in amount such as to increase the water-holding capacity of said fibers.

4,041,122
PROCESS FOR MOLDING OF HOLLOW ARTICLES

James R. Quick, and William A. Wittosch, Jr., both of Warwick, N.Y., assignors to International Paper Company, New York, N.Y.

Filed June 1, 1976, Ser. No. 691,470
Int. Cl.[2] B29C *1/06*
U.S. Cl. 264—277 14 Claims



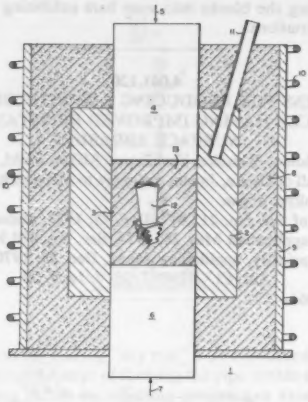
1. The process of manufacturing a hollow article which comprises:
   a. providing a mold with a first wire longitudinally disposed therein and containing first and second followers disposed about the first wire in close abutment with both the first wire and inside wall of the mold, said followers maintaining the first wire spaced from the inside wall of the mold so as to define an annular space between the first wire and the inside wall of the mold;
   b. positioning the second follower proximally of the distal end of the mold and spaced distally from the first follower thereby sealing a set of gates provided in the mold;
   c. introducing a molding material under pressure into said annular space proximally of the proximal end of the first follower thereby distally displacing the first follower;
   d. continuing the distal displacement of the first follower thereby engaging the second follower and, thereafter, distally displacing both the first and second followers thereby unsealing the set of gates;
   e. thereafter introducing molding material into the annular space through the set of gates to continue the distal displacement of the followers while material is molded around the first wire; and
   f. stripping the resulting hollow article from the first wire.

4,041,123
METHOD OF COMPACTING SHAPED POWDERED OBJECTS

Frederick F. Lange, Murrysville, and Gerald R. Terwilliger, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 135,642, April 20, 1971, abandoned.
This application Dec. 22, 1972, Ser. No. 317,878
Int. Cl.[2] C04B *35/60*
U.S. Cl. 264—332 8 Claims

1. In the method of producing a substantially fully dense shaped member of a refractory powdered material having a given densification temperature, the steps comprising:
   a. forming a shaped body from refractory powdered material said shaped body characterized by voids and being larger than, but similar to, the desired final shape of the member,
   b. surrounding the shaped body with a confined mass of a transverse diameter of at least twice that of the maximum transverse dimension of the body, of a non-reactive, non-fusible pressure-transmitting powder having a melting point above the given densification temperature of body, the shaped body being symmetrically or centrally disposed within the confined mass,
   c. applying an initial pressure undirectionally to the confined mass of pressure-transmitting powder and the body therein, and heating the body to a temperature substantially below its densification temperature,
   d. thereafter, incrementally increasing the temperature of the body until the given densification temperature is

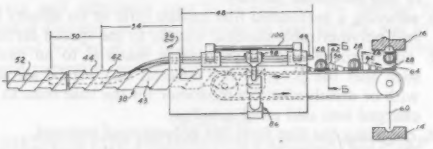


reached and concurrently incrementally increasing the unidirectional pressure to the confined pressure-transmitting powder, the pressure being isostatically transmitted to the body, whereby the voids in the body are substantially completely eliminated and the body has been compacted to the desired shape, and
   e. thereafter, cooling the shaped body and releasing the pressure, and separating the formed shaped body from the pressure-transmitting powder.

4,041,124
METHOD IMPROVEMENTS IN REMOVING ARTICLES FROM WHEEL BLOW MOLDING MACHINES

John F. Seelye, Thomaston, Conn., assignor to Monsanto Company, St. Louis, Mo.

Filed May 12, 1975, Ser. No. 576,559
Int. Cl.[2] B29C *17/07*
U.S. Cl. 264—336 10 Claims



1. In a method of removing blow molded thermoplastic articles from a vertically disposed wheel blow molding machine having continuously revolving mold sections containing said articles sequentially moving radially away from the wheel axis during mold opening, which method includes:
   ejecting said articles transversely downwardly out of the mold sections in a direction substantially along the plane of rotation of said sections to pockets of a takeaway conveyor;
   the improvements in said method comprising, in combination, the steps of:
   A. positioning the articles in the conveyor pockets such that an end portion protrudes laterally of one side thereof;
   B. capturing such end portions within a spiral channel of

a rotating screw while the articles advance with the pockets of the moving conveyor; and then

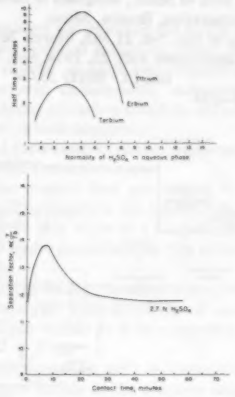
C. turning such captured articles sequentially downwardly to a substantially vertical position beyond the end of said conveyor by means of such rotating screw and contour of a cooperating guide rail.

4,041,125

PROCESS FOR SEPARATION OF THE LANTHANIDES

Jorolf Alstad, Oslo, and Leif Farbu, Strommen, both of Norway, assignors to Forskningsgruppe for Sjeldne Jordarter, Oslo, Norway

Continuation-in-part of Ser. No. 478,357, June 11, 1974, abandoned. This application May 19, 1976, Ser. No. 688,046
Claims priority, application Norway, June 15, 1973, 732492
Int. Cl.[2] C01F *17/00*
U.S. Cl. 423—21 **3 Claims**



1. A liquid-liquid extraction process for the separation of yttrium from terbium comprising:

a. admixing a mixture of rare earth elements including at least yttrium and terbium and impurities in aqueous solution with sulfuric acid to form an aqueous phase comprising an aqueous solution of rare earth sulfates including at least yttrium sulfate and terbium sulfate;

b. contacting said aqueous phase with an organic phase comprising an organic solvent containing di(2-ethylhexyl) phosphoric acid, said organic solvent being substantially immiscible with water;

c. maintaining the contact between the aqueous phase and the organic phase for a sufficient time so that substantially all of the yttrium and terbium are extracted into the organic phase;

d. separating the aqueous phase from the organic phase;

e. subjecting the separated organic phase of step (d) to a back extraction with an aqueous phase comprising an aqueous solution with sulfuric acid;

f. regulating the time of contact between the separated organic phase and the back extraction aqueous phase to a period of less than the time to total extraction equilibrium for the phases and between the half time in minutes for the extraction of terbium from the separated organic phase into the back extraction aqueous phase and the half time in minutes for the extraction of yttrium from the separated organic phase into the back extraction aqueous phase; and

g. separating the separated organic phase from the back extraction aqueous phase.

4,041,126

SEPARATION AND SELECTIVE RECOVERY OF PLATINUM AND PALLADIUM BY SOLVENT EXTRACTION

John Baltz, Lakewood, and Enzo Coltrinari, Arvada, both of Colo., assignors to PGP Industries, Inc., Santa Fe Springs, Calif.

Filed Dec. 18, 1975, Ser. No. 642,146
Int. Cl.[2] C01G *55/00*
U.S. Cl. 423—22 **14 Claims**

1. A process for the separation and selective recovery of platinum and palladium values from an aqueous acidic medium which comprises:

contacting the medium with a mixed organic extraction reagent comprising a water immiscible solvent having dissolved therein an organically substituted secondary amine compound of the general formula:

wherein R_1 and R_2 are hydrocarbon groups and $R_1 + R_2$ contain between 18 and 35 carbon atoms, said compound being sufficiently soluble in said solvent to make a 1% solution and capable of forming complexes with platinum and palladium that are preferentially soluble in said solvent and whereby said contacting results in the formation of an organic extract phase and an aqueous raffinate phase,

maintaining said medium at an emf of between about −425 and −650 millivolts during said contacting operation,

separating said organic extract phase from said aqueous raffinate phase,

contacting said organic extract phase with an acidified aqueous solution of a water soluble reducing agent to form an aqueous phase loaded with palladium and a platinum containing organic extract phase,

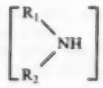
separating said platinum containing organic phase from said palladium containing aqueous phase,

contacting said platinum containing organic extract phase with at least the stoichiometric quantity of an aqueous alkaline stripping agent required for neutralization of said extract phase, said contact resulting in the formation of an queous phase loaded with platinum and a stripped organic phase.

13. A continuous process for the separation and selective recovery of platinum dissolved in aqueous chloride solutions with palladium which comprises:

reducing said aqeuous chloride solution to an emf between about −425 mv and −650 mv,

contacting said aqueous chloride solution for a predetermined time period with an organic solvent containing at least 1% by weight of an organically substituted secondary amine compound of the general formula



wherein R_1 and R_2 are hydrocarbon groups and $R_1 + R_2$ contain between 18 and 35 carbon atoms, said compound having a solubility of at least 1% in said solvent and being capable of forming complexes of platinum and palladium that are preferentially soluble in the organic solvent and whereby the contacting results in the creation of an organic extract phase and an aqueous raffinate phase,

isolating said extract phase from said raffinate phase,

contacting said extract phase with at least the stoichiometric quantity of an aqueous alkaline solution required to neutralize the chloride form of said amine to selectively sepa-

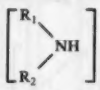
rate said platinum values from said palladium values in said organic extract phase, and form a platinum stripped organic extract phase and an aqueous platinum containing strip solution, and

isolating said aqueous solution from said platinum extract phase.

14. A continuous process for the separation and selective recovery of palladium dissolved in aqueous chloride solutions with platinum which comprises:

reducing said solution to an emf between about −425 mv and −650 mv,

contacting said aqueous chloride solution for a predetermined time period with an organic solvent containing at least 1% by weight of an organically substituted secondary amine compound of the general formula:



wherein R_1 and R_2 are hydrocarbon groups and $R_1 + R_2$ contain between 18 and 35 carbon atoms, said compound capable of forming complexes of platinum and palladium that are preferentially soluble in the organic solvent and whereby said contacting results in the creation of an organic extract phase and an aqueous raffinate phase,

separating said organic extract phase from said aqueous raffinate phase,

contacting said organic extract phase with an aqueous solution containing a reducing agent acidified to between about 0.1 to about 3.0 N-HCL to strip palladium values from said organic extract phase, said contact resulting in the formation of a palladium loaded aqueous phase and a stripped organic phase containing said platinum,

separating said loaded aqeuous phase and said stripped organic phase, and recovering palladium from said loaded aqueous phase.

4,041,127

METHOD OF TREATING THE FLUORINE-CONTAINING MUD PRODUCED BY THE ACID POLISHING OF LEAD GLASS SO AS TO FORM BASIC LEAD CARBONATE

Wolfgang Porcham, Hall in Tirol, Austria, assignor to D. Swarovski & Co., Wattens, Austria

Filed May 14, 1976, Ser. No. 686,599

Claims priority, application Germany, July 2, 1975, 2529545

Int. Cl.[2] C01G 21/14

U.S. Cl. 423—92 **4 Claims**

1. A process for the production of lead carbonate by treatment of fluorine-containing mud produced in the polishing of lead glass with etching acid said mud being substantially of the following composition by weight:

$PbSO_4$—15 to 70
K_2SiF_6—20 to 50
Na_2SiF_6—10 to 25
$BaSO_4$—0 to 10
$CaSO_4$—0 to 3
KBF_4—0 to 3

and comprising the steps of:

a. separating said mud from the etching acid;

b. reacting the same with an aqueous alkali carbonate solution and filtering the solution;

c. dissolving the residue in nitric acid and precipitating the fluorides in the form of alkali hexafluorosilicates by the addition of a compound providing a source of alkali ions at a pH of the solution under 4 and filtering out the precipitate; and

d. adjusting the pH of the resulting solution to above 6.5 by the addition of alkali carbonate to the solution to precipitate basic lead carbonate.

4,041,128

METHOD FOR PURIFICATION OF EXHAUST GASES

Henry C. Bramer, Venetia, and Edward Shapiro, Pittsburgh, both of Pa., assignors to Pittsburgh Environmental and Energy Systems, Inc., Pleasant Hills, Pa.

Filed Aug. 18, 1975, Ser. No. 605,558

Int. Cl.[2] B01D 53/34

U.S. Cl. 423—213.2 **4 Claims**

1. A process for the removal of sulfur oxides from internal combustion engine exhaust at ambient to 1200° F which consists essentially of passing said exhaust through a chamber containing a chemically reactive mixture consisting essentially of a sulfide and an oxide of a single metal selected from the group consisting of iron, copper and zinc; said sulfide and oxide being initially present in a ratio of about one part of sulfide to 1–2 parts of oxide

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4,041,129

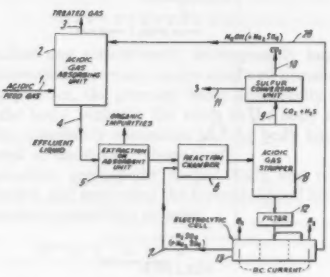
REMOVAL OF ACIDIC GASES FROM HYDROCARBON STREAMS

Raymond C. Foster, Boston, and James J. Humphries, Jr., Wellesley, both of Mass., assignors to Stone & Webster Engineering Corporation, Boston, Mass.

Continuation of Ser. No. 21,383, March 20, 1970, abandoned. This application July 23, 1974, Ser. No. 490,935

Int. Cl.[2] B01D 53/34

U.S. Cl. 423—234 **17 Claims**



1. In a cyclic process for substantially reducing the carbon dioxide and/or hydrogen sulfide content present as acidic gases in a gas obtained from the cracking of a hydrocarbon selected from the group consisting of gas oil, naphtha and ethane, and said gas further containing undesirable organic impurities therein, with simultaneous regeneration of reagent materials which comprises:

a. passing the cracked gas containing the acidic gases through an aqueous sodium hydroxide solution and obtaining an effluent containing the undesirable organic impurities and said acidic gases in converted form;

b. reacting said effluent liquid with aqueous sulfuric acid or an aqueous mixture containing sulfuric acid and sodium sulfate in an amount sufficient to substantially liberate the converted acidic gases consisting essentially of hydrogen sulfide and/or carbon dioxide that may be present therein;

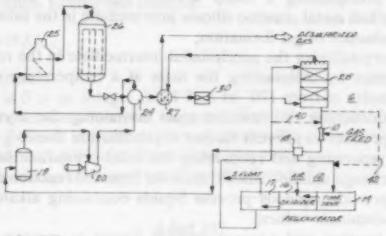
c. subjecting said treated effluent liquid to a stripping operation to remove any liberated gases therefrom and thereby leaving an aqueous sodium sulfate containing solution; and

d. subjecting said resulting aqueous sodium sulfate containing solution to an electrolytic process treatment whereby aqueous sulfuric acid or an aqueous mixture of sulfuric acid and sodium sulfate is collected at the anode and is recycled for utilization in the aforesaid reaction step and aqueous sodium hydroxide which forms at the cathode is collected and recycled for use in the sodium hydroxide treatment step, the improvement which comprises treating the effluent from the alkali metal hydroxide treatment of step (a) to remove substantially all organic impurities therefrom.

4,041,130
PROCESS FOR DESULFURIZATION OF COKE OVEN GAS

Mark Mackles, Tarzana, Calif., assignor to The Ralph M. Parsons Company, Pasadena, Calif.

Filed Dec. 29, 1975, Ser. No. 644,759
Int. Cl.[2] B01D *53/34*
U.S. Cl. 423—220 **25 Claims**



1. A continuous process for reducing the sulfur content of a feed gas stream which contains hydrogen, water, and as sulfur species, hydrogen sulfide, at least one organo-sulfur compound, and an inorganic carbon-sulfur compound selected from the group consisting of carbon disulfide, carbonyl sulfide, and mixtures thereof, which comprises:

a. treating the feed gas stream to remove hydrogen sulfide in a hydrogen sulfide extraction zone;
b. compressing the treated feed gas stream to provide a partial pressure of hydrogen in the treated feed gas stream of at least about 10 psia when at a temperature sufficient for the catalytic hydrogenation of such a sulfur species to hydrogen sulfide;
c. heating the compressed gas stream to a temperature sufficient for the catalytic hydrogenation of such a sulfur species to hydrogen sulfide to form a reaction stage feed gas stream;
d. catalytically hydrogenating such an organo-sulfur compound to hydrogen sulfide in the reaction stage feed gas stream in a reaction stage at a temperature sufficient for catalytic hydrogenation of such a sulfur species while simultaneously hydrolyzing in the presence of water contained in the feed gas stream the inorganic carbon-sulfur compounds to hydrogen sulfide to provide an effluent gas stream at a temperature substantially above the reaction stage feed gas stream temperature; and
e. cooling and treating the effluent gas stream from the reaction stage to remove hydrogen sulfide in a hydrogen sulfide extraction zone.

4,041,131
SULFUR RECOVERY PROCESS

James T. Forbes, Arlington Heights, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Oct. 14, 1975, Ser. No. 621,701
Int. Cl.[2] B01D *53/14*
U.S. Cl. 423—242 **6 Claims**

1. In a process for removing sulfur oxides from gas mixtures with a solid acceptor for sulfur oxides wherein the solid acceptor is periodically regenerated with a steam-diluted reducing gas and the regeneration off-gas is charged to an absorber-stripper to produce a concentrated sulfur oxides gas stream the improvement which comprises:

a. cooling the regeneration off-gas to a temperature at which a substantial part of the steam contained therein condenses;
b. contacting in a contacting zone the cooled regeneration off-gas with a sulfur dioxide-selective liquid absorbent thereby obtaining a substantially sulfur dioxide free regeneration off-gas and a sulfur dioxide rich liquid absorbent, wherein the sulfur dioxide content of the sulfur dioxide rich liquid varies periodically with the periodic regeneration of the solid acceptor;
c. passing said sulfur dioxide rich liquid absorbent, during periods of operation which produce rich absorbent containing a relatively high sulfur dioxide content, to a rich absorbent holding tank;
d. passing said sulfur dioxide rich liquid absorbent, during periods of operation in which said rich absorbent contains a relatively low amount of sulfur dioxide, to a lean absorbent holding tank;
e. withdrawing a stream of sulfur dioxide rich liquid absorbent from said rich holding tank and passing it at a substantially constant rate to a stripping zone;
f. heating in said stripping zone the sulfur dioxide rich liquid absorbent from step (e) to a temperature at which sulfur dioxide gas is expelled thereby regenerating the liquid absorbent;
g. recovering expelled sulfur dioxide gas,
h. passing said regenerated liquid absorbent to the contacting zone of step (b) to further absorb sulfur dioxide; and,
i. supplying at least intermittently, as a portion of the absorbent to step (b), absorbent from the lean absorbent holding tank, whereby variation of the sulfur dioxide content of the regeneration off-gas is accommodated by varying levels in the rich absorbent holding tank.

4,041,132
FLUID BED DEHYDRATION OF BORAX

George W. Campbell, Jr., Hesperia; David G. Wilkins, and Jerome T. Muench, both of Lancaster, all of Calif., assignors to United States Borax & Chemical Corporation, Los Angeles, Calif.

Continuation of Ser. No. 504,350, Sept. 9, 1974, abandoned. This application Feb. 20, 1976, Ser. No. 659,915
Int. Cl.[2] C01B *35/12*
U.S. Cl. 423—279 **8 Claims**

1. A process for dehydrating borax in a fluidized bed system comprising: introducing borax into a first-stage fluidized bed having a temperature of from about 140° to about 170° F.; transferring said borax from said first-stage fluidized bed to a second-stage fluidized bed, said second stage fluidized bed having a temperature of from about 250° to about 300° F.; transferring said borax without cooling from said second-stage fluidized bed to a third-stage fluidized bed, said third-stage fluidized bed having a temperature of from about 450° to about 600° F. to produce a hot dehydrated borax; transferring said hot borax to a compactor for compaction while said borax is at a temperature of at least 120° up to 600° F., grinding the resultant compacted product, and screening to produce a final dehydrated borax product having about 0.15 to 1 mole of water of hydration, a bulk density of 50 to 60 lbs./ft.^{3}, and about 35 –68% B_2O_3.

4,041,133
AMMONIUM POLYPHOSPHATE PRODUCTION

Donald C. Young, Fullerton, Calif., assignor to Union Oil Company of California, Brea, Calif.

Filed Aug. 15, 1975, Ser. No. 605,016
Int. Cl.[2] C01B *15/16, 25/26;* **C05B** *11/00*
U.S. Cl. 423—305 **11 Claims**

1. The method of producing stable, aqueous solutions of ammonium polyphosphate product having an equivalent polymeric P_2O_5 content of at least about 25 percent of the total P_2O_5 present and higher than the polymeric content obtainable from the acid feed hereinafter defined with only the autogenous heat of reaction between ammonia and the acid mixture hereinafter defined, from a phosphoric acid feed having a polyphosphate content at least 10 percent less than said product determined as a percentage of total P_2O_5, including the steps of;

1. mixing said feed with an amount of substantially anhydrous mineral acid selected from the group consisting of

sulfuric, nitric and hydrochloric acids and combinations thereof, in an amount of at least about 0.1 mole of said mineral acid per mole of P_2O_5 and sufficient to produce a reaction temperature of about 500° to about 750° F. upon neutralization of the resultant acid mixture with ammonia;

2. reacting said acid mixture with at least about 0.12 weight parts of anhydrous ammonia per weight part of said acid mixture under conditions sufficient to produce a molten product melt at said reaction temperature by the autogenous heat of neutralization, said temperature being sufficient to increase the polymeric P_2O_5 content of said acid by at least about 10 percent and form said product of which at least about 25 percent of said P_2O_5 is present as polyphosphate; and
3. quenching the reaction product to a temperature of about 200° F. or less by immersion in an aqueous quench medium.

4,041,134

PROCESS FOR REMOVING SULFATE IONS FROM EXTRACTED PHOSPHORIC ACID EMPLOYING BARIUM COMPOUNDS AND ACTIVATED CARBON

Mitsuo Kikuchi, and Yoichi Hiraga, both of Shin-nanyo, Japan, assignors to Toyo Soda Manufacturing Co., Ltd, Japan

Filed June 11, 1976, Ser. No. 695,309
Claims priority, application Japan, Feb. 13, 1976, 51-13943
Int. Cl.[2] C01B *25/16*
U.S. Cl. 423—321 S **6 Claims**

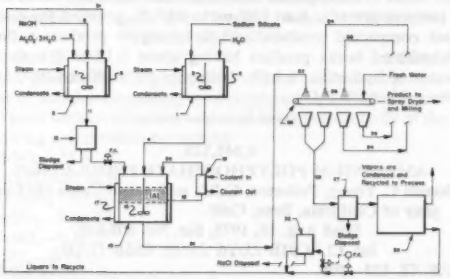
1. A process for removing sulfate ions from extracted phosphoric acid which is substantially free of metallic ion contaminants, which comprises adding less than the stoichiometric equivalent of a barium compound relative to the amount of dissolved sulfate ion to said extracted phosphoric acid to form barium sulfate crystals, adding active carbon to the resulting slurry, separating the solid components from the slurry and recovering purified phosphoric acid.

4,041,135

PRODUCTION OF HIGH CAPACITY INORGANIC CRYSTALLINE BASE EXCHANGE MATERIALS

Lloyd E. Williams, Bel Air; Robert K. Mays, Havre de Grace, and Joseph E. Wagner, III, Abingdon, all of Md., assignors to J. M. Huber Corporation, Locust, N.J.

Filed July 25, 1975, Ser. No. 599,232
Int. Cl.[2] C01B *33/28*; C11D *9/18*
U.S. Cl. 423—329 **20 Claims**



1. A method for producing crystalline base exchange alumino silicate materials having high total ion exchange capacities and specific initial exchange rates, said method comprising the steps of:

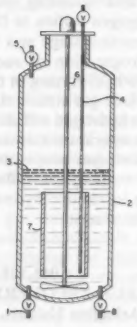
a. preparing an aqueous solution of alkali metal silicate, said silicate having an SiO_2/X_2O mole ratio of from about 1 to 4, wherein X is an alkali metal;
b. subjecting said solution to vigorous agitation and adding to said solution at a controlled rate a clarified aqueous solution of an alkali metal aluminate, said clarified alkali metal aluminate solution being substantially free of halide impurities, organic discoloring complexes and ferruginous sludge;
c. continuing the vigorous agitation of the reaction mass formed by the addition of said alkali metal aluminate to said alkali metal silicate solution while maintaining the temperature of said reaction mass in the range of between 70° and 180° F. and the pH of said reaction mass at a level of at least 10.0;
d. precipitating a finely divided pigmentary amorphous alkali metal alumino silicate intermediate in the substantial absence of gel formation;
e. crystallizing the precipitated intermediate in the reaction mass by maintaining the mass at a temperature on the order of from 170° to 230° F.;
f. quenching the reaction mass containing the crystalline product to prevent further crystallization thereof;
g. separating and recovering the solid crystalline base exchange alumino silicate material from the reaction mass to provide aqueous process liquids containing alkali metal aluminate values;
h. treating said aqueous process liquids to remove halide impurities, organic discoloring complexes and ferruginous sludge, and adjusting to the desired concentration to form clarified aqueous process liquids of suitable concentration to serve as a source of alkali metal aluminate in the initial reaction; and
i. recycling the resulting clarified aqueous process liquids to step (b) for addition to said alkali metal silicate solution as a source of the alkali metal aluminate.

4,041,136

PROCESS FOR THE PRODUCTION OF SILANE

Robert E. Franklin, Spotswood, N.J.; Arthur W. Francis, New City, N.Y., and Gregorio Tarancon, Woodbridge, N.J., assignors to Union Carbide Corporation, New York, N.Y.

Filed Sept. 24, 1976, Ser. No. 726,115
Int. Cl.[2] C01B *33/04*
U.S. Cl. 423—347 **12 Claims**



1. A process for the production of silane in a reaction vessel comprising

i. a single closed chamber,
ii. a hollow tube open at both ends and having a theoretical axis running from end to end which axis is about parallel to the theoretical vertical axis of the chamber, said tube being disposed in the lower portion of the chamber; and
iii. means for circulating liquid in the lower portion of the chamber in such a manner that the liquid flows in a downward direction through the tube and in an upward direction outside of the tube

comprising the following steps:

a. maintaining a melt of lithium chloride in the lower portion of the chamber, the level of the melt being above the tube;
b. activating the circulating means;
c. introducing liquid lithium into the melt in such a manner

that at least a part thereof is brought to the surface of the melt;

d. introducing hydrogen gas above the surface of the melt in such a manner that hydrogen gas reacts with lithium at the surface of the melt to form lithium hydride,

the lithium, lithium hydride, and melt being admixed by the circulating means to provide a homogeneous mixture thereof;

e. introducing, as a gas, a compound or a mixture of compounds having the formula

$$SiH_xCl_{4-x}$$

wherein

x is 0 or an integer from 1 to 3

in such a manner that the gas is dispersed by the circulating means into the mixture whereby the gas contacts the lithium hydride to form silane gas; and

f. removing the silane gas from the chamber.

4,041,137

METHOD OF PRODUCING ALUMINUM FLUORIDE

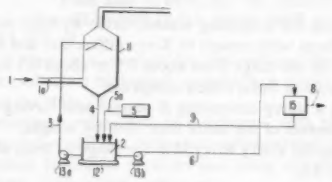
Tatsuo Abe, Kasugai; Toshiki Okamoto, Nagaya; Takao Sakakura, Nagaya, and Tatsuo Tateno, Nagaya, all of Japan, assignors to Sumitomo Aluminum Smelting Company, Ltd., Osaka, Japan

Filed Mar. 25, 1976, Ser. No. 670,215

Claims priority, application Japan, Mar. 25, 1975, 50-36361

Int. Cl.[2] C01F *7/50*

U.S. Cl. 423—489 **18 Claims**



1. A method for the production of aluminum fluoride from a gas containing a fluorine compound, which method comprises circulating between a gas absorbing zone and a storage zone a gas absorbing liquor comprising either water containing alumina or hydrated alumina, or an aqueous aluminum fluoride solution containing alumina or hydrated alumina, introducing said gas into said gas absorbing zone and absorbing said gas into said gas absorbing liquor whereby the absorbed fluorine compound is reacted with alumina or hydrated alumina to precipitate the fluorine as hydrated aluminum fluoride, filtering said precipitated hydrated aluminum fluoride from said gas absorbing liquor and recycling the filtrate from the filtration to the storage zone and recycling same therefrom into the absorbing zone.

4,041,138

PROCESS FOR THE PREPARATION OF CRYSTALLINE POTASSIUM TANTALUM FLUORIDE

Wolfgang Glaeser, and Wolfgang Mathy, both of Goslar, Germany, assignors to Hermann C. Starck, Berlin, Germany

Filed July 21, 1976, Ser. No. 707,225

Claims priority, application Germany, Aug. 21, 1975, 2537354

Int. Cl.[2] C01B *9/08*; C01G *35/00*; C01D *3/02*

U.S. Cl. 423—464 **12 Claims**

1. A process for the production of potassium tantalum fluoride substantially free from compounds of silicon and niobium by use of aqueous hydrofluoric acid having a substantial content of dissolved silicon, which comprises: mixing an aqueous hydrofluoric and sulfuric acid solution of tantalum and niobium salts with a water-insoluble organic solvent thereby extracting at least a portion of said salts from said aqueous solution; separating said organic solvent containing said salts from the residual aqueous solution; mixing said separate organic solvent with aqueous medium thereby selectively extracting substantially all of said niobium from said organic solvent; separating said organic solvent from the residual aqueous medium; mixing said separated organic solvent with aqueous hydrofluoric acid having a substantial content of dissolved silicon; separating the organic solvent from the hydrofluoric acid with which it is mixed; mixing said organic solvent with a silicon-free aqueous solution of an ionizable potassium compound at a temperature above 50° C.; separating said aqueous solution; and cooling said aqueous solution thereby precipitating crystalline potassium tantalum fluoride therefrom substantially free from silicon.

4,041,139

RECOVERY OF SELENIUM FROM URETHANE SOLUTIONS

Thomas A. Washall, Wilmington, Del., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Aug. 30, 1976, Ser. No. 718,635

Int. Cl.[2] C01B *19/00*

U.S. Cl. 423—508 **14 Claims**

1. A process for the recovery of selenium from selenium-containing urethane solutions derived from the selenium catalyzed reaction of an organic compound containing at least one hydroxyl group with carbon monoxide and a nitrogenous organic compound at elevated temperatures and pressures in the presence of a base and/or water, which comprises the steps of:

adding water to the selenium-containing urethane solution forming a urethane-water-alcohol mixture;

contacting the urethane-water-alcohol mixture with a saturated aliphatic or alicyclic paraffin hydrocarbon having from 5 to 16 carbon atoms, or mixtures thereof, to extract selenium compounds from said mixture and form a selenium-containing hydrocarbon phase and a urethane-containing alcohol-water phase;

separating the hydrocarbon phase from the alcohol-water phase;

separating the hydrocarbon from the hydrocarbon phase leaving a selenium compound concentrate; and

recovering selenium from said selenium concentrate.

4,041,140

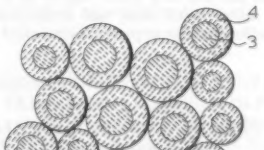
METHOD OF MAKING A SULPHIDE CERAMIC BODY

Tsuneharu Nitta, Katano; Shigeru Hayakawa; Yukio Kasahara, both of Hirakata, and Ziro Terada, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed July 16, 1974, Ser. No. 489,048

Int. Cl.[2] C01B *17/20*; C04B *35/70*

U.S. Cl. 423—561 R **6 Claims**



1. A method of making a sulphide ceramic, comprising forming a compacted body from a metal oxide powder starting material, said powder having a mean particle size of less than 1 micron, and sulphurizing at least one portion of said compacted body in an atmosphere consisting essentially of carbon disulphide at a temperature in the range of 400° to 1,000° C, said temperature being less than the transformation tempera-

ture of said sulphide and for a time sufficient to make at least one portion a sulphide having a density of at least 92% and a uniform ceramic texture of from 1 to 10 microns grain size.

4,041,141

PRODUCTION OF ELEMENTAL SULPHUR

Gerald Moss, Oxford, England, assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed Feb. 12, 1976, Ser. No. 657,539

Claims priority, application United Kingdom, Feb. 3, 1975, 4486/75

Int. Cl.[2] C01B *17/06*

U.S. Cl. 423—571 **13 Claims**

1. A method of producing elemental sulphur from a solid compound of sulphur, comprising treating particles ccontaining the said solid compound in a lower fluidized bed under such conditions that sulphur is liberated as SOx, passing the SOx upwardly into an upper fluidized bed at a temperature within the range of 310° to 1350° C. and containing char, (as herein defined), whereby at least some SOx is reduced to elemental sulphur, the char of the upper fluidized bed having a density lower than the density of the particles in the lower fluidized bed, whereby the upper fluidized bed floats upon the lower fluidized bed.

4,041,142

METHOD FOR REMOVING SULFUR OXIDE FROM WASTE GASES AND RECOVERING ELEMENTAL SULFUR

Raymond H. Moore, Richland, Wash., assignor to Battelle Memorial Institute, Richland, Wash.

Filed Dec. 8, 1975, Ser. No. 638,677

Int. Cl.[2] B01D *47/00*; C01B *17/02*

U.S. Cl. 423—573 G **11 Claims**

1. A process for removing sulfur dioxide from a gaseous stream containing said sulfur dioxide, which comprises:

in a scrubber contacting said stream with a sulfur dioxide depleted molten fused salt mixture, containing a dissolved oxidizing catalyst and maintained at a temperature not greater than 500° C., to (1) oxidize said sulfur dioxide to sulfur trioxide, (2) dissolve said sulfur trioxide and (3) form a sulfur dioxide depleted gaseous stream and a sulfur trioxide loaded molten liquid salt mixture

separating said sulfur trioxide loaded molten liquid salt mixture and the sulfur dioxide depleted gaseous stream before the molten salt mixture becomes saturated with sulfur trioxide,

dissociating the separated sulfur trioxide loaded molten liquid salt mixture to produce a gaseous effluent of sulfur trioxide and to regenerate said sulfur dioxide depleted molten fused salt mixture,

combining said sulfur trioxide with hydrogen sulfide to form a gaseous mixture having a SO_3:H_2S molar ratio not substantially greater than 1:3, and

maintaining said mixture in a Claus reactor at an elevated temperature sufficient to cause said hydrogen sulide to reduce said sulfur trioxide to produce elemental sulfur and water.

4,041,143

PROCESS FOR PREPARING FIBROUS ALKALI METAL TITANATE

Yoshinori Fujiki, and Fujio Izumi, both of Sakura, Japan, assignors to National Institute for Researches in Inorganic Materials, Ibaraki, Japan

Filed Mar. 19, 1976, Ser. No. 668,535

Claims priority, application Japan, Mar. 20, 1975, 50-034027

Int. Cl.[2] C01G *23/00*; C01D *13/00, 17/00*

U.S. Cl. 423—598 **5 Claims**

1. A process for preparing a fibrous alkali metal titanate, which comprises:

mixing 5–50 mole % of an alkali metal titanate of the formula: M_2O $(TiO_2)_n$, wherein M is sodium, potassium, rubidium or cesium and n ranges from 1 to 7, or an alkali metal titanate forming components with a flux of sodium, potassium, rubidium or cesium tungstate or molybdate, wherein the alkali metal component of each reactant is the same alkali metal;

melting the mixture at a temperature of 700°-1350° C, whereby said alkali metal titanate grows as a fibrous material; and

recovering said fibrous alkali metal titanate from said flux.

4,041,144

PROCESS FOR PREPARING STANNIC OXIDE HYDRATE

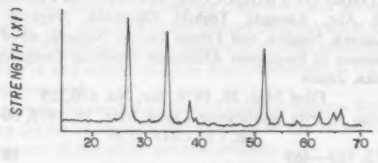
Isao Obara, and Kazuo Yagami, both of Yatsushiro, Japan, assignors to Kohjin Co., Ltd., Tokyo, Japan

Filed May 7, 1975, Ser. No. 575,228

Claims priority, application Japan, May 10, 1974, 49-51275

Int. Cl.[2] C01G *19/02*

U.S. Cl. 423—618 **5 Claims**



1. A process for preparing stannic oxide hydrate substantially amorphous with respect to X-ray diffraction and having bound water in the range from about 0.5 to about 0.7 mole of H_2O per 1 mole of SnO_2 which comprises

a. forming a slurry containing β-stannic acid having a free water content of not more than 70% by weight,

b. adjusting the slurry to a pH in the range of from about 2 to about 4.5,

c. heating the slurry to a temperature in the range from 80° C to 130° C in an atmosphere having a humidity of not less than 0.5 kg. of steam/1 kg. of dry air, and

d. recovering the resulting stannic oxide hydrate product, the product having a free water content of from 5% to 25% by weight and bound water in the range from about 0.5 to about 0.7 mole of H_2O per 1 mole of SnO_2.

4,041,145

SELENYL AND TELLURYL DERIVATIVES OF STEROIDS

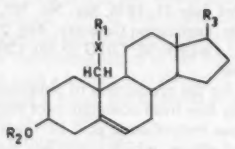
Augustinus Petrus Maria van der Veek, Voorschoten, Netherlands, assignor to Philips-Duphar B.V., Amsterdam, Netherlands

Filed Nov. 28, 1975, Ser. No. 636,099

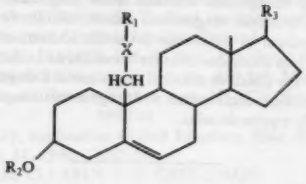
Claims priority, application Netherlands, Nov. 28, 1974, 7415526

Int. Cl. A61k *43/00*; C07j *9/00*

U.S. Cl. 424—1 **20 Claims**



1. Novel selenyl- and telluryl compounds of the formula



in which X is selected from the group consisting of a selenium and tellurium atom, R_1 is a hydrocarbon radical, R_2 is selected from the group consisting of a hydrogen atom, an alkanoyl group or an organic group that is easily removed from the oxygen atom, and R_3 is a 1,5-dimethyl hexyl optionally containing a member of the group consisting of methyl, and ethyl at the 4-position.

12. A diagnostic composition for diagnostic examination into abnormalities of internal organs, wherein the composition contains, besides a liquid or solid carrier material that can be tolerated by the human body, a radioactively labelled selenyl- or telluryl derivative of a steroid of claim **1.**

4,041,146

METHOD FOR DETECTION OF BIOLOGICAL PARTICLES

Ivar Giaever, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed May 1, 1975, Ser. No. 573,610
Int. Cl.[2] G01N *33/00, 33/16;* A61K *43/00*
U.S. Cl. 424—1 **31 Claims**

1. A diagnostic method for determining the presence or absence of select biological particles in a liquid sample comprising the steps of:

contacting surface area of a substrate with first biological particles, said first biological particles being specific to the select biological particles and being dispersed as a first layer coating said surface area;

contacting the coated surface area of said substrate with the sample liquid for a preselected period of time;

applying a tagging medium to the coated surface area resulting from the preceding step, said tagging medium making tags available to said coated surface area;

contacting the coated surface area resulting from the preceding step with a cleaving agent solution, said cleaving agent solution being capable of selectively destroying such bonding as may exist between said first biological particles and select biological particles;

separating from said substrate the cleaving agent solution used in the preceding step together with any matter contained therein released from the coated surface area and

examining said separated cleaving agent and contents thereof for the presence of emanations from the tags to indicate the presence of the select biological particles in said liquid sample.

4,041,147

ANGIOTENSIN IRADIOIMMUNOASSAY

Rinaldo G. Pagnucco, Somerville, N.J.; Roberta J. Muse, Philadelphia, Pa., and Dasika R. Murty, North Brunswick, N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed July 29, 1976, Ser. No. 709,674
Int. Cl.[2] G01N *33/00;* G21H *5/02*
U.S. Cl. 195—103.5 A **4 Claims**

1. A process for maximizing the generation of angiotensin I from angiotensinogen which comprises incubating the angiotensinogen substrate in a buffer solution of pH about 7.4, said buffer comprising about equimolar amounts of tris (hydroxymethyl)aminomethane and maleic acid.

4,041,148

NEW AEROSOL PROPELLANTS FOR PERSONAL PRODUCTS

Charles W. Simons, Bedford; Gerald J. O'Neill, Arlington, and Joel A. Gribens, Framingham, all of Mass., assignors to W. R. Grace & Co., Cambridge, Mass.

Continuation-in-part of Ser. No. 622,246, Oct. 14, 1975, abandoned. This application Aug. 16, 1976, Ser. No. 714,522
Int. Cl.[2] C09K *3/30*
U.S. Cl. 424—45 **4 Claims**

1. An aerosol container pressurized by a material selected from the class consisting of bis(difluoromethyl) ether, perfluorodimethyl ether and mixtures thereof.

4,041,149

COMPOSITION AND METHOD OF CONTROLLING AND PREVENTING MOUTH ODOR

Maria Corazon Gaffar; Abdul Gaffar, both of Somerset, and John P. Hauschild, Sommerville, all of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Filed Jan. 12, 1976, Ser. No. 648,231
Int. Cl.[2] A61K *7/16*
U.S. Cl. 424—57 **9 Claims**

1. An improved oral composition containing a peroxydiphosphate salt as an effective non-antimicrobial, non-staining mouth odor inhibitor.

5. A method of preventing and controlling mouth odor which comprises applying the composition of claim **1** to the oral cavity, wherein the peroxydiphosphate is activated by the salivary phosphatases to form the peroxymonophosphate anion which slowly and continuously generate hydrogen peroxide which deodorizes the oral cavity.

4,041,150

KERATIN MODIFYING AGENTS AND METHOD OF BENEFICIALLY MODIFYING FILAMENTOUS KERATIN MATERIALS

Sulo A. Karjala, Chicago, Ill., assignor to Wilson Foods Corporation, Oklahoma City, Okla.

Filed May 27, 1971, Ser. No. 147,623
Int. Cl.[2] A61K *7/09, 7/11*
U.S. Cl. 424—71 **9 Claims**

1. A method of modifying filamentous keratins which comprises contacting said keratins with an effective amount of an aqueous treating composition containing an effective amount of a reducing agent and 0.1 to 8% of a water or alkali-soluble reaction product of (1) a water-soluble product of acid hydrolysis of keratinaceous materials to a peptide state with (2) a beneficiating agent for said filamentous keratins capable of reacting with said water-soluble hydrolysis product through the formation of amide linkages, removing the excess aqueous treating composition from said keratins, and contacting the modified filamentous keratins with an effective amount of an aqueous solution of an oxidizing agent.

4,041,151

RESIN COMPOSITIONS CONTAINING 0,0,0',0'-TETRAMETHYL 0,0'-THIODI-P-PHENYLENE PHOSPHOROTHIOATE

Jerry Peter Milionis, Somerset, and Larry Dean Spicer, Princeton, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed July 2, 1975, Ser. No. 592,433
Int. Cl.[2] A61K *31/74;* A01N *9/36*
U.S. Cl. 424—78 **11 Claims**

1. A method for the prolonged control of siphonaptera on dogs and cats, comprising attaching to the dogs or cats a flexible collar of a composition of a polyvinyl chloride resin having a weight average molecular weight of from 60,000 to 280,000 and an inherent viscosity of from about 0.5 to 1.2, and as the active siphonapteracidal agent from 13% to 50% by weight of 0,0,0',0'-tetramethyl 0,0'-thiodi-p-phenylene phosphorothioate

around the neck of the dog or cat which is to be protected against siphonaptera infestation or reinfestation.

4,041,152

PHARMACEUTICAL FORMULATION OF INTERFERON INSOLUBILIZED BY FIXATION ON A SUPPORT

Charles Chany, 17, rue Emile-Dubois, Paris, France; Brigitte Galliot, 11, rue Thibaud, Paris, France (75014); Marie-Josephe Chevalier, 13, rue Epee de Bois, Paris, France (75005), and Helmut Ankel, 74, av. Denfert-Rochereau, Paris, France (75674)

Filed July 22, 1974, Ser. No. 490,658
Claims priority, application France, July 27, 1973, 73.27538
Int. Cl.[2] A61K *45/02*
U.S. Cl. 424—85 6 Claims

1. A pharmaceutical product comprising an effective amount of interferon rendered insoluble by fixation by way of covalent bonds on a previously activated support selected from the group consisting of agarose, dextran, levan, mannan, pectin, xylan, galactan, glycerol-pectate and heparin.

4. A pharmaceutical product comprising interferon fixed by electrostatic bonds on a support comprising concavallin A.

4,041,153

METHODS AND PHARMACEUTICAL PREPARATION FOR THE TREATMENT OF HYPERCHOLESTEROLAEMIA

Alan N. Howard, Cambridge, England, assignor to Bristol-Myers Company, New York, N.Y.

Filed June 2, 1975, Ser. No. 583,308
Claims priority, application United Kingdom, June 4, 1974, 24794/74
Int. Cl.[2] A61K *33/24, 31/215, 31/19*
U.S. Cl. 424—131 10 Claims

1. A pharmaceutical composition for use in the treatment per os of hypercholesterolemia, which comprises a hypocholesteremic effective amount of

a. a compound selected from p-chlorophenoxyisobutyric acid, the methyl, ethyl, propyl or butyl ester thereof or a sodium, potassium, calcium, magnesium, aluminum, zinc, bismuth or iron salt thereof, and

b. an ingestible non-toxic bismuth salt capable of dissolution in human gastrointestinal juices, the total amount of non-toxic metal being from 3.2 to 90 equivalents per mole of p-chlorophenoxyisobutyric acid or ester or salt thereof.

6. A method for the treatment of hypercholesterolemia, in which there is administered to the patient per os a hypocholesteremic effective dose of a pharmaceutical composition comprising

a. a compound selected from p-chlorophenoxyisobutyric acid, the methyl, ethyl, propyl or butyl ester thereof or a sodium, potassium, calcium, magnesium, aluminum, zinc, bismuth or iron salt thereof, and

b. an ingestible non-toxic bismuth salt capable of dissolution in human gastrointestinal juices, the total amount of non-toxic metal being from 3.2 to 90 equivalents per mole of p-chlorophenoxyisobutyric acid or ester or salt thereof.

4,041,154

MAGNESIUM-CONTAINING PHARMACEUTICAL COMPOSITIONS

Joachim Helbig, and Franz Fischer, both of Tutzing, Germany, assignors to Verla-Pharm Arzneimittel-Fabrik Apotheker H. J. v. Ehrlich, Tutzing, Germany

Filed Feb. 17, 1976, Ser. No. 658,717
Claims priority, application Germany, Feb. 20, 1975, 2507354
Int. Cl.[2] A61K *31/195, 33/14, 33/18;* C07C *101/22*
U.S. Cl. 424—150 3 Claims

1. A pharmaceutical preparation useful as an infarct prophylactic, a sedative and muscle relaxant, or a sedative and tranquilizer, comprising in combined form one of magnesium diglutamate and magnesium diaspartate, and at least one alkali or alkaline earth metal halogenide selected from magnesium chloride, magnesium bromide, magnesium iodide, sodium or potassium chloride, sodium or potassium bromide, sodium or potassium iodide, calcium chloride, calcium bromide, and calcium iodide, the ratio of the alkali or alkaline earth metal halogenide to the one of magnesium diglutamate and magnesium diaspartate being substantially equimolecular.

4,041,155

LONG ACTING SOMATOSTATIN COMPOSITION

Richard L. Fenichel, Wyncote, and Howard J. Levin, Norristown, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed Oct. 29, 1974, Ser. No. 518,650
Int. Cl.[2] A61K *37/00;* C07C *103/52*
U.S. Cl. 424—177 3 Claims

1. A long-acting growth hormone release-inhibiting composition suitable for subcutaneous or intramuscular injection comprising:

a. Somatostatin or linear somatostatin, and

b. an aqueous vehicle containing about 80% polyethylene glycol 400.

4,041,156

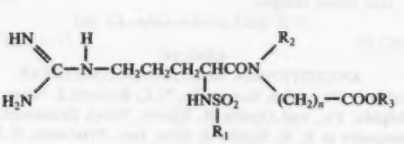
N[2]-ALKOXYNAPHTHALENESULFONYL-L-ARGININAMIDES AND THE PHARMACEUTICALLY ACCEPTABLE SALTS THEREOF

Shosuke Okamoto, Kobe; Ryoji Kikumoto; Kazuo Ohkubo, both of Tokyo; Tohru Tezuka, Yokohama; Shinji Tonomura, Tokyo; Yoshikuni Tamao, Yokohama, and Akiko Hijikata, Kobe, all of Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo, Japan

Continuation-in-part of Ser. No. 671,436, March 29, 1976, which is a division of Ser. No. 622,390, Oct. 14, 1975, abandoned. This application Feb. 6, 1976, Ser. No. 656,014
Claims priority, application Japan, Nov. 8, 1974, 49-128774; Nov. 8, 1974, 49-128775; Nov. 29, 1974, 49-136695; Nov. 29, 1974, 49-136697; Feb. 25, 1975, 50-023268; Feb. 26, 1975, 50-023635; Mar. 5, 1975, 50-026768; Mar. 11, 1975, 50-029357; Mar. 11, 1975, 50-029358

The portion of the term of this patent subsequent to Apr. 19, 1994, has been disclaimed.
Int. Cl.[2] C07C *103/52;* A61K *37/00*
U.S. Cl. 424—177 7 Claims

1. N[2]-alkoxynaphthalenesulfonyl-L-argininamides having the formula (I):



(I)

or the pharmaceutically acceptable salts thereof wherein R_1 is naphthyl substituted with at least one C_1-C_5 alkoxy; R_2 is C_3-C_{10} cycloalkyl or C_4-C_{10} cycloalkylalkyl; R_3 is selected from the group consisting of hydrogen, C_1-C_{10} alkyl, C_6-C_{10} aryl and C_7-C_{12} aralkyl; and n is an integer of 1, 2 or 3.

4,041,157
FUNGICIDAL PYRIMIDINE DERIVATIVES

Brian Kenneth Snell, Bracknell, England, assignor to Imperial Chemical Industries Limited, London, England

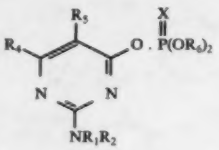
Division of Ser. No. 114,079, Feb. 9, 1971, Pat. No. 3,906,094, which is a continuation-in-part of Ser. No. 624,126, March 20, 1967, abandoned. This application Aug. 27, 1975, Ser. No. 608,331

Claims priority, application United Kingdom, Mar. 31, 1966, 14266/66; Mar. 31, 1966, 14267/66

Int. Cl.[2] A01N *9/36;* C07D *239/24*

U.S. Cl. 424—200 10 Claims

1. A pyrimidine derivative having the formula:



or a salt thereof wherein X is an atom of oxygen or sulphur; R_1 is hydrogen; R_2 is hydrogen, alkyl containing not more than 6 carbon atoms or alkenyl containing not more than 6 carbon atoms; phenyl or halo- or methyl-substituted phenyl, cyclohexyl or acetyl; R_4 is alkyl containing not more than 6 carbon atoms or a phenyl radical; R_5 is hydrogen, or alkyl containing not more than 6 carbon atoms or alkenyl containing not more than 6 carbon atoms; R_6 is alkyl containing not more than 6 carbon atoms.

7. A method of combating plant fungus which comprises applying to a plant or to seeds thereof, a fungicidally effective amount of a pyrimidine derivative as defined in claim 1.

4,041,158
O-ALKYL-O-[1-(3-NITROPHENYL)-2-CARBALKOXY-VINYL]-THIONO(THIOL)-PHOSPHORIC (PHOSPHONIC) ACID ESTERS

Fritz Maurer; Hans-Jochem Riebel, both of Wuppertal; Ingeborg Hammann, Cologne, and Wilhelm Stendel, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

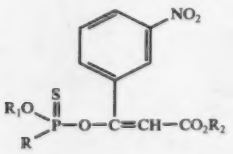
Filed Nov. 11, 1975, Ser. No. 630,856

Claims priority, application Germany, Nov. 26, 1974, 2455763

Int. Cl.[2] A01N *9/36;* C07F *9/18, 9/205*

U.S. Cl. 424—212 10 Claims

1. An O-alkyl-O-[1-(3-nitrophenyl)-2-carbalkoxyvinyl]-thiono(thiol)-phosphoric(phosphonic) acid ester of the formula



in which

R is alkyl, alkoxy or alkylthio, each with 1 to 6 carbon atoms, or phenyl, and

R_1 and R_2 each independently is alkyl with 1 to 6 carbon atoms.

9. A method of combating insect pests which comprises applying to the pests or a habitat thereof an insecticidally effective amount of a compound according to claim 1.

4,041,159
NEMATOCIDAL 4-AMINO-N-THIO-SUBSTITUTED 3,5-DINITROBENZENESULFONAMIDES

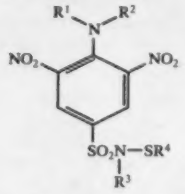
James L. Platt, Novato, and William L. Schinski, San Rafael, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed Feb. 12, 1976, Ser. No. 657,678

Int. Cl.[2] A01N *9/16*

U.S. Cl. 424—228 5 Claims

1. A method for the control of nematodes which comprises applying to said nematodes a nematocidally effective amount of a compound of the formula



wherein R^1 is alkyl of 1 to 6 carbon atoms, R^2 is alkyl of 1 to 6 carbon atoms, R^3 is alkyl of 1 to 6 carbon atoms and R^4 is alkyl of 1 to 6 carbon atoms, haloalkyl of 1 to 2 carbon atoms and 1 to 5 of the same or different halogens selected from fluoro, chloro or bromo, or phenyl substituted with up to 2 fluoro, chloro, bromo or alkyl of 1 to 4 carbon atoms.

4,041,160
WATER-SUSPENDIBLE COMPOSITION COMPRISING ROBENIDINE

Morris E. Stolar, Tel-Aviv, Israel, assignor to Abic Ltd., Israel

Filed Dec. 30, 1975, Ser. No. 645,379

Claims priority, application Israel, Jan. 8, 1975, 46406

Int. Cl.[2] A61K *31/63, 31/635, 31/155*

U.S. Cl. 424—229 15 Claims

1. A composition which forms a stable suspension in water, said composition comprising a compound selected from the group consisting of 1,3-bis-[(p-chlorobenzylidene) amino]-guanidine and physiologically acceptable salts thereof, N-methyl-2-pyrrolidone, a protective colloid and water, buffered to a pH of 7–9.5.

4,041,161
CEPHALOSPORINS HAVING AN α-ACYLAMINOACETIC ACID SIDE CHAIN

Karoly Kocsis, Basel; Heinrich Peter, and Hans Bickel, both of Binningen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed May 9, 1975, Ser. No. 576,398

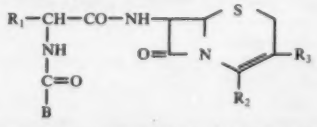
Claims priority, application Switzerland, May 13, 1974, 6494/74

Int. Cl.[2] C07D *501/36;* A61K *31/38;* C07D *501/32, 501/54*

U.S. Cl. 424—246 6 Claims

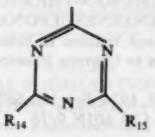
1. A compound of the formula

(I)



wherein R_1 denotes phenyl, thienyl, furyl, 1,4-cyclohexadienyl or phenyl substituted by hydroxy, R_2 represents a free carboxyl group, R_3 denotes hydrogen, lower alkanoyloxymethyl, benzoylthiomethyl, pyridiniomethyl, pyridiniomethyl substituted by lower alkyl, halogen, trifluoromethyl, hydroxyl, carboxyl and lower alkoxy carbonyl, and B denotes one of the groups B_5 or B_6, of which B_5 represents the formula

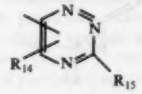
(B5)



wherein R_{14} and R_{15} independently of one another denote hydrogen, halogen, a free hydroxyl or mercapto group, a lower alkoxy or a lower alkyl mercapto group or a lower alkoxy carbonyloxy or a lower alkoxy carbonyl mercapto group, or mono- or di-lower alkylated amino group, a lower alkanoylated amino group, or ureido group

or of which B_6 represents the formula

(B6)



wherein R_{14} and R_{15} have the meaning mentioned under formula (B_5), the substituent R_{14} preferably occupying the 5-position of the as-triazine ring, a tautomer, or a salt thereof.

5. A pharmaceutical preparation for combatting bacteria which comprises an antibacterially effective amount of a compound of claim **1** and a pharmaceutically usable excipient.

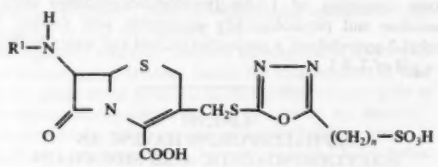
4,041,162

7-ACYL-3-(SULFOALKYL SUBSTITUTED OXADIAZOLYLTHIOMETHYL) CEPHALOSPORINS

David A. Berges, Wayne, Pa., assignor to SmithKline Corporation, Philadelphia, Pa.

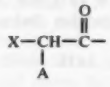
Filed Mar. 11, 1976, Ser. No. 666,095
Int. Cl.[2] C07D *501/36;* **A61K** *31/38*
U.S. Cl. 424—246 **19 Claims**

1. A compound of the formula:



in which:

R^1 is an acyl group of the formula:



where:

X is thienyl, dihydrophenyl, phenyl or phenyl monosubstituted with hydroxy, hydroxymethyl, formamido, ureido or carboxymethylamino;

A is NH_2, OH, COOH or SO_3H; or formyloxy where X is phenyl; and

n is one to five,

or a non-toxic pharmaceutically acceptable salt thereof.

13. An antibacterially effective pharmaceutical composition comprising a compound as claimed in claim **1** and a pharmaceutically acceptable carrier therefor.

15. A method of treating bacterial infections comprising administering internally by injection to an infected or susceptible warm-blooded animal an antibacterially effective but non-toxic dose of a compound as claimed in claim **1.**

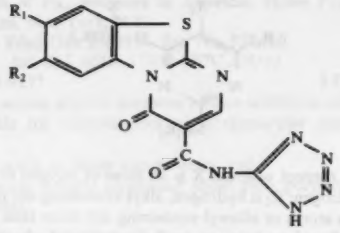
4,041,163

N-(5-TETRAZOLYL)-4-OXO-4H-PYRIMIDO(2,1-B)BENZOTHIAZOLE-3-CARBOXAMIDE ANTIALLERGY AGENTS

Jasjit S. Bindra, Groton, and Saul B. Kadin, New London, both of Conn., assignors to Pfizer Inc., New York, N.Y.

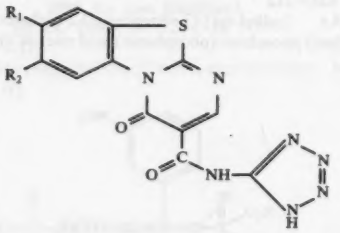
Filed Mar. 29, 1976, Ser. No. 671,030
Int. Cl.[2] A61K *31/505;* **C07D** *513/02*
U.S. Cl. 424—251 **16 Claims**

1. A compound selected from the group consisting of:



and a pharmaceutically acceptable base salt thereof wherein R_1 is selected from the group consisting of hydrogen, alkyl having from 1 to 3 carbon atoms, alkoxy having from 1 to 3 carbon atoms, hydroxy, chloro, fluoro, trifluoromethyl, nitro, amino and methylthio; R_2 is selected from the group consisting of hydrogen, alkyl having from 1 to 3 carbon atoms, alkoxy having from 1 to 3 carbon atoms, hydroxy, chloro, fluoro and methylthio; and R_1 and R_2 when taken together are selected from the group consisting of methylenedioxy and ethylenedioxy.

9. A method of inhibiting the release of mediators of anaphylaxis in mammals and thereby reducing bronchoconstriction covered by said mediators, said method which comprises oral, intraperitoneal or inhalation administration to a mammal an amount of a compound which inhibits release of said mediators, said compound being selected from the group consisting of



and a pharmaceutically acceptable base salt thereof wherein R_1 is selected from the group consisting of hydrogen, alkyl having from 1 to 3 carbon atoms, alkoxy having from 1 to 3 carbon atoms, hydroxy, chloro, fluoro, trifluoromethyl, nitro, amino and methylthio; R_2 is selected from the group consisting of hydrogen, alkyl having from 1 to 3 carbon atoms, alkoxy having from 1 to 3 carbon atoms, hydroxy, chloro, fluoro and methylthio; and R_1 and R_2 when taken together are selected from the group consisting of methylenedioxy and ethylenedioxy.

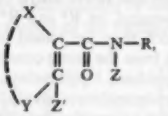
4,041,164

FUNGICIDAL DISPERSIONS OF CARBOXYLIC ACID AMIDES

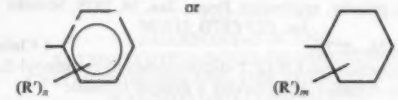
Konrad Albrecht, Fischbach, Taunus; Heinz Frensch, Frankfurt am Main, and Kurt Härtel, Hofheim, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Oct. 2, 1974, Ser. No. 511,120
Claims priority, application Germany, Oct. 4, 1973, 2349908; June 26, 1974, 2430625
Int. Cl.² A01N *9/22*
U.S. Cl. 424—263 8 Claims

1. A fungicidal dispersion comprising from 0.2 to 5 percent, by weight of said dispersion, of an aluminum chelate of a polynuclear hydroxy-quinone selected from the group consisting of naphthazarin, quinizarin, chrysazin, and alizarin present in said dispersion as a stabilizer discouraging crystal growth of the fungicidally-active ingredient, said dispersion comprising, as the fungicidally-active ingredient, from 5 to 50 percent by weight of a compound of the formula



wherein X and Y, together with the —C=C— group, form a partially unsaturated or totally unsaturated five- or six-membered carbocyclic or heterocyclic ring system selected from the group consisting of unsubstituted furan, pyran, dihydrofuran, dihydropyran, oxazole, triazole, thiadiazole, thiazole, dioxane, dithiane, 4H-thiapyran, 4H-thiapyran dioxide, 4H-thiapyran monoxide, 5,6-dihyro-1,4-oxathiine, 5,6-dihydro-oxathiine-4,4-dioxide, pyridine, cyclopentene, cyclohexene, norbornadiene, and phenyl, and such ring systems which, in addition to substituent Z', are substituted with at least halogen, alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms, oxymethylene, or phenyl; Z' is hydrogen, halogen, or alkyl having 1 to 4 carbon atoms; Z is hydrogen, straight or branched alkyl having 1 to 6 carbon atoms, or straight or branched haloalkyl having from 1 to 6 carbon atoms; and R is



wherein R' is dioxymethylene or the same or different alkyl or alkoxy having 1 to 4 carbon atoms, *m* is an integer from 0 to 3, and *n* is an integer from 0 to 3 or, if

is dihydropyran and Z is methyl, then *n* is integer from 1 to 3, said fungicidally-active ingredient being dispersed in at least one member selected from the group consisting of C_8 to C_{25} paraffinic mineral oils boiling at a temperature above 140° C.; rape-seed oil; arachis oil; sunflower oil; cotton seed oil; liquid monoesters and diesters formed between C_1 to C_{12} monoalcohols and C_2 to C_{10} monobasic and dibasic carboxylic acids, and monoesters having from 8 to 12 carbon atoms and said diesters having at most 32 carbon atoms.

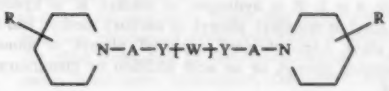
4,041,165

PHARMACEUTICALLY USEFUL NITROGEN CONTAINING HETEROCYCLIC DERIVATIVES

Irving Shemano, Cincinnati, Ohio, assignor to Richardson-Merrell Inc., Wilton, Conn.

Division of Ser. No. 370,425, June 15, 1973, Pat. No. 3,937,835.
This application Nov. 3, 1975, Ser. No. 628,529
Int. Cl.² A61K *31/445*
U.S. Cl. 424—267 8 Claims

1. A method of treating conditions of delayed hypersensitivity which comprises administering to a patient in need thereof a compound of the formula



wherein [W] is an aromatic polycyclic nucleus selected from the group consisting of dibenzofuran, dibenzothiophene, carbazole, N-(lower)alkylcarbazole, xanthene, xanthone, thioxanthene, and phenoxathiin; each Y is carbonyloxy, carbonylthio, oxygen, divalent sulfur, or carbonyl with the proviso that when Y is carbonyloxy or carbonylthio, [W] is other than thioxanthene or phenoxathiin, and when Y is oxygen or divalent sulfur, [W] is other than thioxanthene or phenoxathiin; A is a straight or branched alkylene chain of from 1 to 6 carbon atoms with the proviso that when Y is carbonyloxy or carbonylthio, A contains from 2 to 6 carbon atoms; R is hydrogen, a straight or branched lower alkyl group of from 1 to 4 carbon atoms, phenyl or benzyl; or a pharmaceutically acceptable acid addition salt thereof, in an amount effective to suppress delayed hypersensitivity.

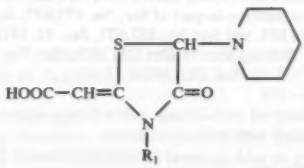
4,041,166

METHOD OF PRODUCING DIURESIS USING THIAZOLIDINONE ACETIC ACID DERIVATIVES

Gerhard Satzinger, Denzlingen; Manfred Herrmann, St. Peter, and Karl-Otto Vollmer, Freiburg im Breisgar, all of Germany, assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 553,715, Feb. 27, 1975, Pat. No. 3,971,794.
This application Mar. 18, 1976, Ser. No. 668,159
Claims priority, application Germany, Mar. 25, 1974, 2414345
Int. Cl.² A61K *31/44*
U.S. Cl. 424—267 1 Claim

1. A method for producing diuresis in a mammal which comprises the administration of a compound of the general formula:



wherein R_1 is a lower alkyl radical containing 1 to 4 carbon atoms in an effective amount to cause diuresis.

4,041,167

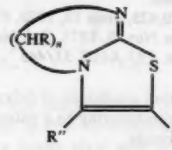
ANTIINFLAMMATORY IMIDAZOTHIAZOLES

Robert E. Moser, Mentor; Larry J. Powers, Madison, and Zaven S. Ariyan, Mentor, all of Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Jan. 19, 1976, Ser. No. 650,318
Int. Cl.² A61K *31/425*
U.S. Cl. 424—270 9 Claims

7. A method of preventing and inhibiting the formation of

granuloma tissue in an animal subject, which method comprises administering to said animal a nontoxic antiinflammatory amount of a compound of the formula:



wherein *n* is 2; R is hydrogen or methyl; R′ is hydrogen, C_1–C_3 alkyl or thioalkyl, phenyl, or carboxy methyl; and R″ is C_1–C_4 alkyl, 2-benzofuranyl, naphthyl, phenyl, or mono- or disubstituted phenyl, or an acid addition or quaternary salt thereof.

4,041,168

NITROIMIDAZOLE DERIVATIVE WITH ANTIBACTERIAL ACTIVITY

Alessandro Assandri, Milan; Giancarlo Lancini, Pavia; Giancarlo Volpe, and Bruno Cavalleri, both of Milan, all of Italy, assignors to Gruppo Lepetit S.p.A., Milan, Italy

Filed Dec. 29, 1975, Ser. No. 644,382

Claims priority, application United Kingdom, Jan. 15, 1975, 01684/75

Int. Cl.² A61K *31/415*; C07D *233/91*

U.S. Cl. 424—273 **4 Claims**

1. The compound 5-[(1-hydroxy-1-methyl)ethyl]-1-methyl-2-nitroimidazole.

3. A method for combatting the infections caused by *Trichomonas vaginalis* in mammals, which comprises administering an effective amount of 5-[(1-hydroxy-1-methyl)ethyl]-1-methyl-2-nitro-imidazole.

4,041,169

PHARMACEUTICAL METHOD FOR USING PYRANO-AND THIOPYRANOINDOLE DERIVATIVES

Christopher A. Demerson, Montreal; Leslie G. Humber, Dollard des Ormeaux; Andre A. Asselin, Lemoyne; Ivo Jirkovsky, Montreal, and Thomas A. Dobson, Roxboro, all of Canada, assignors to Ayerst McKenna and Harrison Ltd., Montreal, Canada

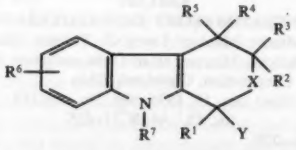
Division of Ser. No. 555,906, March 5, 1975, Pat. No. 4,003,913, which is a continuation-in-part of Ser. No. 377,837, July 9, 1973, Pat. No. 3,880,853, and Ser. No. 217,627, Jan. 13, 1972, Pat. No. 3,852,285. This application Oct. 28, 1976, Ser. No. 736,624

Int. Cl.² A61K *31/40*

U.S. Cl. 424—274 **8 Claims**

1. A method of preventing and treating ulcers in warm blooded animals which comprises:

administering to said mammal an effective dose of from about 0.1 milligram to about 50 milligrams per kilogram of mammal weight per day of a compound selected from those of the formulae I and Ia



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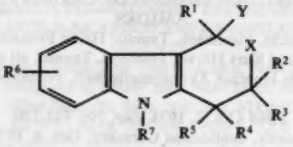


in which R^1 is lower alkyl or lower cycloalkyl; R^2, R^3, R^4 and R^5 are the same or different selected from the group consisting of hydrogen and lower alkyl; R^6 is hydrogen, lower alkyl, hydroxy, lower alkoxy, lower alkanoyloxy, nitro or halo; R^7 is hydrogen, lower alkyl, lower alkenyl, propargyl, phenyl(lower)alkyl or an amino(lower)alkyl radical of formula -Alk-NR^8R^9 wherein Alk is an alkylene selected from the group consisting of $CR^{10}R^{11}CR^{12}R^{13}$, $CR^{10}R^{11}CR^{12}R^{13}CR^{14}R^{15}$, and $CR^{10}R^{11}CR^{12}R^{13}CR^{14}R^{15}CR^{16}R^{17}$ wherein R^{10}, R^{11}, R^{12}, R^{13}, R^{14}, R^{15}, R^{16} and R^{17} are hydrogen or lower alkyl and R^8 and R^9 are either the same or different selected from the group consisting of hydrogen and lower alkyl, or R^8 is lower alkyl and R^9 is p-chlorophenacyl, or R^8 and R^9 together with the nitrogen atom to which they are joined form a heterocyclic amine radical selected from the group consisting of 1-pyrrolidinyl, piperidino, morpholino, 1-piperazinyl, 4-(lower alkyl)-1-piperazinyl and 4-[hydroxy(lower)alkyl]-1-piperazinyl; X is thio; and Y is lower akyl, phenyl(lower)alkyl or an amino(lower)alkyl radical of formula -Alk-NR^8R^9 is an alkylene selected from the group consisting of $CR^{10}R^{11}$, $CR^{10}R^{11}CR^{12}R^{13}$, $CR^{10}R^{11}CR^{12}R^{13}CR^{14}R^{15}$ and $CR^{10}R^{11}CR^{12}R^{13}CR^{14}R^{15}CR^{16}R^{17}$ wherein R^{10}, R^{11}, R^{12}, R^{13}, R^{14}, R^{15}, R^{16} and R^{17} are hydrogen or lower alkyl and R^8 and R^9 are as defined herein; with the proviso that at least one of R^7 and Y is -Alk-NR^8R^9 and that in the compounds of formula Ia, Y is -Alk NR^8R^9 as defined herein; and the corresponding acid addition salt with a pharmaceutically acceptable acid.

4,041,170

FIELD AND GARDEN AGRICULTURAL FUNGICIDE

Takaaki Ohtsuka; Keigo Satake; Shiro Yamazaki; Nobuo Hatakeyama, and Takeo Watanabe, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

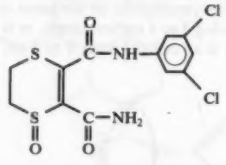
Filed Jan. 26, 1976, Ser. No. 652,011

Claims priority, application Japan, Jan. 24, 1975, 50-9686

Int. Cl.² C07D *339/08*

U.S. Cl. 424—277 **4 Claims**

1. 2-carbamoyl-3-N-(3′,5′-dichlorophenyl)-carbamoyl-5,6-dihydro-p-dithiin-1-oxide having a general formula:



4,041,171

OCTYL THIOBENZOATE USED AS AN ACARICIDE

Jean Marie De Muylder, Kraainem, Belgium, assignor to Societe d'Etudes et de Realisations Scientifiques en Abrege S.E.R.E.S.C.I.S.P.R.L., Brussels, Belgium

Filed Dec. 29, 1975, Ser. No. 645,070

Claims priority, application United Kingdom, Jan. 2, 1975, 00033/75

Int. Cl.² A01N *9/12*

U.S. Cl. 424—301 **7 Claims**

1. A process for treating animals or plants infested with

acarid pests which comprises applying thereto an acaricidally effective amount of octyl thiobenzoate.

4,041,172

COMPOSITIONS AND METHODS FOR COMBATING INSECT PESTS OR FUNGAL PESTS OF PLANTS

Charles Brian Barlow, Camberley, England, assignor to Imperial Chemical Industries Limited, London, England

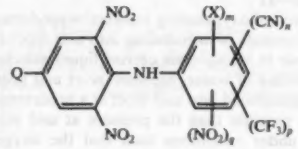
Division of Ser. No. 461,219, April 15, 1974, Pat. No. 3,950,377, which is a continuation-in-part of Ser. No. 425,279, Dec. 17, 1973, abandoned. This application Nov. 28, 1975, Ser. No. 636,298

Claims priority, application United Kingdom, Dec. 20, 1972, 58692/72; Feb. 9, 1973, 6392/73; Feb. 9, 1973, 6393/73; Feb. 9, 1973, 6394/73; Feb. 9, 1973, 6395/73; May 15, 1973, 23046/73; May 15, 1973, 23047/73

Int. Cl.[2] A01N *9/06, 9/20*

U.S. Cl. 424—304 12 Claims

1. An insecticidal or plant fungicidal composition for use against insect pests or fungal pests of plants comprising as an active ingredient an insecticidally or fungicidally amount of a diphenylamine derivative of the formula:



wherein either (a) Q represents a cyano or trifluoromethyl group, and X represents a halogen atom, *m* is an integer from zero to three, *n* is zero or one, *p* is an integer from zero to two, and *q* is an integer from zero to three, the sum of *m, n, p* and *q* being an integer from two to five; or (b) Q represents a nitro group and X represents a halogen atom, *m* is an integer from zero to three, *n* is zero to one, *p* is an integer from zero to two, and *q* is an integer from zero to three, the sum of *n* and *p* being an integer from one to three, and the sum of *m, n, p* and *q* being an integer from two to five, with a major amount of an insecticidally or plant fungicidally acceptable carrier.

4,041,173

2-CARBOXY-(7-,8- AND 9-SUBSTITUTED)-5-OXO-5H-DIBENZO (a,d) CYCLOHEPTENES AND THE CORRESPONDING 10,11-DIHYDRO COMPOUNDS

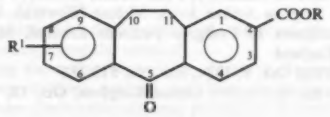
Peter H. Nelson, and Karl G. Untch, both of Los Altos, Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Oct. 6, 1975, Ser. No. 619,723

Int. Cl.[2] C07C *63/44*

U.S. Cl. 424—308 13 Claims

1. A compound selected from the group of compounds represented by the formula



R is hydrogen or alkyl having one to twelve carbon atoms;

R^1 is at the 7, 8 or 9 position and is halogen, hydroxy, lower alkoxy of 1 to 6 carbon atoms inclusive or lower alkyl of 1 to 4 carbon atoms, inclusive;

the dotted lines represent an additional bond between the carbon atoms at the 10- and 11- positions; and

the pharmaceutical acceptable salts thereof.

4,041,174

METHOD OF TREATING DEPRESSION

Alfred T. Sapse, Beverly Hills, Calif., assignor to Rom-Amer Pharmaceuticals, Ltd., Las Vegas, Nev.

Filed Aug. 16, 1974, Ser. No. 498,176

Int. Cl.[2] A61K *31/245*

U.S. Cl. 424—310 22 Claims

1. A method of treating depression which method consists essentially of treating a depressed patient with,

I. by injection or infusion, during a period of at least three weeks, at least 600 mg a week, or

II. at least about 300 mg daily, taken orally, for a period of at least about 30 days, of

i. an ester local anesthetic, which may be administered by injection, infusion, or orally, and which is selected from the class consisting of butylaminobenzoate, amydricaine, benoxinate, benzocaine, isobucaine, butacaine, butethamine, meta butethamine, meta butoxycaine, cyclomethycaine, hexylcaine, mepivacaine, meprylcaine, naepaine, parethoxycaine, piperocaine, procaine, 2-chloroprocaine, propanocaine, proparacaine, propoxycaine, tetracaine, tutocaine, the hydrates thereof, the acid salts thereof, and complexes thereof which hydrates, acid salts, and complexes slowly release the active material; or

ii. metabolic splinters of such ester anesthetic.

4,041,175

USE OF PLEUROMUTILIN FOR THE TREATMENT OF SWINE DYSENTERY

William E. Brown, Princeton; Charles O. Baughn, Flemington, both of N.J., and Wayne H. Linkenheimer, Washington Crossing, Pa., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed May 13, 1974, Ser. No. 469,260

Int. Cl.[2] A61K *31/22*

U.S. Cl. 424—311 4 Claims

1. A method for treating swine dysentery which comprises orally administering to an infected swine an effective amount of pleuromutilin.

4,041,176

PRESERVATIVE COMPOSITION FOR WOOD AND WOOD BUILDING MATERIALS AND METHOD OF USING SAME

Wolfgang Metzner, Krefeld, and Hubert Koddebusch, Moers, both of Germany, assignors to Desowag-Bayer Holzschutz GmbH, Dusseldorf, Germany

Filed Aug. 7, 1975, Ser. No. 602,903

Claims priority, application Germany, Aug. 9, 1974, 2438334

Int. Cl.[2] A01N *9/24*

U.S. Cl. 424—318 29 Claims

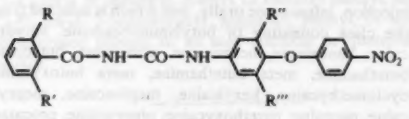
1. In a preservative composition for wood, including an organic solvent base, at least one insecticide, an organic solvent base, at least one insecticide, organic fungicide or wood-preserving organic chemical compound which is soluble in said solvent, and a marking agent, the improvement which comprises said marking agent comprising at least one organic lithium compound soluble in said solvent, said organic lithium compound being present in an amount sufficient to permit a qualitative determination of the lithium in wood to which said composition is applied.

4,041,177
4-NITRO-4'-[N-(N'-BENZOYL)-UREIDO]-DIPHENYL ETHERS

Wilhelm Sirrenberg, Sprockhoevel; Jürgen Schramm, Dormagen; Erich Klauke, Odenthal; Ingeborg Hammann, Cologne, and Wilhelm Stendel, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Jan. 23, 1976, Ser. No. 651,986
Claims priority, application Germany, Feb. 6, 1975, 2504983
Int. Cl.[2] C07C *127/22*; A61K *31/17*
U.S. Cl. 424—322 13 Claims

1. A 4-nitro-4'-[N-(N'-benzoyl)-ureido]-diphenyl ether of the formula



(I),

in which

R is chlorine, fluorine, or methyl,

R' is hydrogen, chlorine or fluorine, and

R'' and R''' are identical and are each hydrogen or chlorine, but if R is chlorine and R' is hydrogen, R'' and R''' can only be hydrogen.

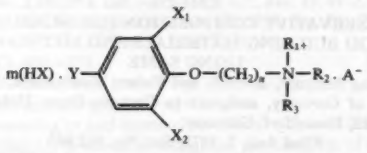
12. A method of combating insects which comprises applying to the insects or an insect habitat an insecticidally effective amount of a compound according to claim 1.

4,041,178
SUBSTITUTED PHENOXYALKYL QUATERNARY AMMONIUM COMPOUNDS AS ANTIARRHYTHEMIC AGENTS

Stanley J. Strycker, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 484,525, July 1, 1974, Pat. No. 3,932,664, which is a division of Ser. No. 164,086, July 19, 1971, Pat. No. 3,875,215. This application Jan. 12, 1976, Ser. No. 648,555
Int. Cl.[2] A61K *31/14*
U.S. Cl. 424—329 8 Claims

5. A method for combatting cardiac arrhythmias which comprises administering to an animal a cardiac antiarrhythmic amount of a quaternary ammonium compound corresponding to the formula



wherein Y represents amino, loweralkylamino or diloweralkylamino; R_1 and R_2 represent lower alkyl; R_3 independently is selected from the group consisting of phenacyl, mono-, di-, or trihalophenacyl, substituted lower alkyl, substituted lower alkenyl and substituted lower alkynyl substituted with a substituent selected from the group consisting of phenyl, halophenyl, dihalophenyl, and trihalophenyl; X_1 and X_2 both represent halogen; A^- represents a stoichiometric equivalent quantity of a pharmaceutically-acceptable anion; *n* represents one of the integers 2, 3 or 4; HX represnets a stoichiometric equivalent quantity of a pharmaceutically-acceptable acid; and *m* represents one of the integers 0 and 1.

4,041,179
WATER DISPERSIBLE CHEWING GUM BASE

Marcella C. Stubits, St. Louis, and James Teng, St. Louis County, both of Mo., assignors to Anheuser-Busch, Incorporated, St. Louis, Mo.

Filed June 25, 1976, Ser. No. 699,661
Int. Cl.[2] A23G *3/30*
U.S. Cl. 426—3 5 Claims

1. A hydroxypropyl starch acetate having elastic properties and having variable water solubility characteristics, said starch acetate having a degree of molecular substitution of hydroxypropyl groups of about 3 to about 6 and a degree of substitution of acetate group of about 0.5 to about 0.92.

4,041,180
INTRODUCING GASES INTO FERMENTATION LIQUIDS

Richard John Hugh Wilson, Copthorne, England, assignor to Brewing Patents Limited, London, England

Filed Mar. 5, 1976, Ser. No. 664,352
Claims priority, application United Kingdom, Apr. 8, 1975, 14461/75
Int. Cl.[2] C12C *11/00*; C12B *1/14*
U.S. Cl. 426—11 10 Claims

1. A method of oxygenating brewers' wort during fermentation which consists of introducing into said wort a solution of oxygen or air in an aqueous carrier liquid selected from the group consisting of water, brewers' wort and beer, said solution being introduced into said wort at a predetermined depth, at a higher pressure than the pressure at said predetermined depth and under conditions such that the oxygen or air is retained in solution in the wort, said solution being supersaturated with oxygen or air at the temperature and under the pressure of the wort at said predetermined depth, the volume of said oxygen or air solution introduced during a single fermentation being not more than about 5% of the bulk volume of said wort in said fermentor.

2. A method of degassing brewers' wort during fermentation or degassing fermented beer, said wort or beer being supersaturated with carbon dioxide, which method comprises

1. dissolving a gas selected from the group consisting of oxygen, nitrogen, carbon dioxide and a mixture thereof in an aqueous carrier liquid selected from the group consisting of water, brewers' wort and beer to form a solution which is saturated with said gas at a superatmospheric pressure, and
2. introducing said solution into said wort or beer at a predetermined depth, under conditions leading to a high degree of shear thereby causing said gas to be liberated from said supersaturated solution as a multitude of microbubbles, said multitude of microbubbles being characterized by a distinctive milky appearance, said solution becoming supersaturated with said gas under the temperature and pressure of said wort or beer at said predetermined depth.

4,041,181
PET FOOD AND METHOD OF MAKING SAME

Ian Edward Burrows, Gaddesby; Peter Arthur Cheney, Mountsorrell, and Stephen Arthur Ariss, Melton Mowbray, all of England, assignors to Pedigree Petfoods Limited, Melton Mowbray, England

Filed Oct. 9, 1974, Ser. No. 513,281
Claims priority, application United Kingdom, Oct. 18, 1973, 48664/73
Int. Cl.[2] A23B *4/12*
U.S. Cl. 426—55 4 Claims

1. A method of making a proteinaceous food product comprising the steps of: subjecting proteinaceous material in the presence of added fermentable carbohydrate to acid-producing fermentation and autolysis until said material is semi-liquid and has an acid pH; incorporating 3 to 25% of a gellable or coagulable binder selected from the group consisting of heatcoagula-

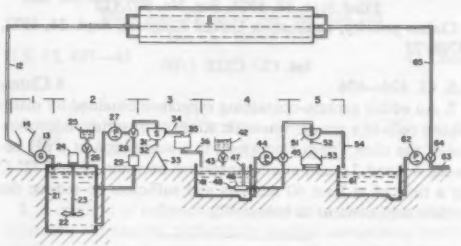
ble protein, starch and hydrophillic gums and mixtures thereof with the fermented and autolysed material; adding humectant in the quantity of from 2 to 10% by weight of the total mix; shaping the mix; and heating said mixture thereby causing the binder to gel or coagulate to form a coherent chewy solid shaped product; the acidity and moisture content of said fermented and autolysed material being such that the final product has a pH value of 4.0–5.5 and water activity between 0.85 and 1.00.

4,041,182

BIO-PROTEIN FEED MANUFACTURING METHOD

Lennart G. Erickson, 1070 E. Meadow Circle, Palo Alto, Calif. 94303, and Howard E. Worne, Rte. 73, Lyton Industrial Park, Berlin, N.J. 08009

Filed Apr. 16, 1975, Ser. No. 568,768
Int. Cl.² C02C *1/14;* A23K *1/12*
U.S. Cl. 426—59 **13 Claims**



1. A method for manufacturing a bioprotein animal feed supplement comprising: providing a slurry of raw organic waste containing biochemically volatile and biochemically non-volatile components, converting said biochemically volatile component to water soluble lower molecular weight intermediates essentially by the addition of organism-free hydrolyzing enzymes to said raw organic waste slurry at a temperature of about 60°–140° F, then separating said soluble lower molecular weight intermediates from biiochemically non-volatile solids in said waste solution, thereafter combining the separated lower molecular weight intermediates with cell synthesizing microorganisms substantially only under aerobic conditions permitting the microorganisms to feed upon said soluble lower molecular weight intermediates and thereby grow to produce a biomass of single cell microorganisms, and recovering said biomass of cells in a form suitable for use as an animal feed supplement.

4,041,183

METHOD FOR THE FORMATION OF ARTICLES FROM COLLAGENOUS MATERIAL

Leonard Daniel, 44 Budyan Road, Grays Point, New South Wales, Australia

Continuation of Ser. No. 395,943, Sept. 10, 1973, abandoned. This application July 17, 1975, Ser. No. 596,605
Claims priority, application Australia, Sept. 18, 1972, 462/72
Int. Cl.² B65D *81/34*
U.S. Cl. 426—105 **32 Claims**

1. A method for the formation of a water soluble collagenous article comprising the steps of:

mixing the collagenous paste, slurry or dispersion with an ester of alginic acid selected from the group consisting of water dispersable alkylene glycols up to pentylene glycol and methyl ester, the ester being present in a weight ratio of from about 1:25 to about 1:5 relative to the collagenous material on a dry weight basis, and the mixture having a solids content of from about 5% to about 20% by weight to produce a coherent plastic mass;

forming the mixture into the shape of the article to be formed;

increasing the pH of the mixture to render it sufficiently alkaline that setting of the mixture is obtained when an increased pH in alkaline range is maintained, the increase in pH being obtained by using an alkali capable of effecting such setting without the necessity of drying to effectively reform a collagen article having the desired shape in which the collagen fibers are bound together by the alginate ester, and

maintaining the mixture at the increased pH until the mixture is set.

4,041,184

METHOD OF CANDYING FRUIT AND FRUIT RINDS

Remigio Bonacina, Via Ai Monti 2, Mandello Lario (Como), Italy

Filed June 2, 1976, Ser. No. 692,240
Claims priority, application Italy, June 5, 1975, 5166/70
Int. Cl.² A23B *7/08*
U.S. Cl. 426—321 **4 Claims**

1. A method for candying fruit or fruit rinds comprising the steps of

selecting said fruit or fruit rinds and subjecting them to a preliminary cooking;

immersing the cooked fruit or fruit rinds into a candying syrup having a starting concentration in soluble solids in the range of about 10° to 60° Brix at a temperature of about 50°–60° C;

controlling the value of the concentration of the syrup until it is decreased to a constant value and measuring said constant value together with the time elapsed DT;

calculating the difference DC between the value of the starting concentration and the constant value of said concentration of the syrup;

calculating the mean absorption rate of the treated fruit or fruit rinds as a ratio DC/DT of the difference between the starting and the constant value of the concentration of the syrup and the time interval DT;

increasing the concentration of the syrup at the same rate DC/DT until it reaches a final concentration in the range of about 65° to 75° Brix.

4,041,185

BLUEBERRY FLAVOR

Thomas Holden Parliment, New City, N.Y., assignor to General Foods Corporation, White Plains, N.Y.

Continuation-in-part of Ser. No. 607,319, Aug. 25, 1975, abandoned. This application Nov. 24, 1976, Ser. No. 744,836
Int. Cl.² A23L *1/235*
U.S. Cl. 426—534 **12 Claims**

1. A blueberry flavoring composition comprising linalool and a flavorant selected from the group consisting of trans-2-hexenol, trans-2-hexenal, cis-3-hexenol, cis-3-hexenal and combinations thereof, the linalool and flavorant being combined in a weight ratio of about 1:1 to about 1:4 and the flavoring composition effective to impart a blueberry flavor to a liquid foodstuff when employed at a level of about 0.1 to 1.0 microliters linalool and about 0.1 to 4.0 microliters of flavorant per 100 ml. of liquid and to a dry foodstuff system when employed at a level of about 0.0002% to 0.004% linalool and about 0.0002% to 0.016% flavorant by weight of the dry system.

4,041,186

FLAVORING WITH (2-METHYL-3-FURYL)(METHYLTHIOMETHYL) SULFIDE

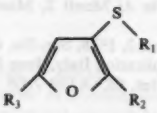
William J. Evers, Middletown; Howard H. Heinsohn, Jr., Hazlet; Manfred Hugo Vock, Hartshorne, and Christopher Giacino, Califon, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Continuation-in-part of Ser. No. 666,347, March 12, 1976, Pat. No. 4,007,287, which is a continuation-in-part of Ser. No. 581,962, May 29, 1975, Pat. No. 3,988,510. This application Nov. 11, 1976, Ser. No. 740,947

Int. Cl.[2] A23L *1/226*

U.S. Cl. 426—535 **2 Claims**

1. A process for augmenting or enhancing the flavor of a foodstuff comprising adding to said foodstuff from about 0.0001 ppm up to about 250 ppm of a 3-furyl sulfide compound having the strucutre:



wherein R_1 is methylthiomethyl, R_2 is methyl, and R_3 is hydrogen.

4,041,187

SOYBEAN BEVERAGE AND PROCESS

Alvin I. Nelson; Marvin P. Steinberg, both of Champaign, and Lun-Shin Wei, Urbana, all of Ill., assignors to The University of Illinois Foundation, Urbana, Ill.

Continuation-in-part of Ser. No. 374,581, July 6, 1973, Pat. No. 3,901,978, which is a continuation-in-part of Ser. No. 282,499, Aug. 21, 1972, abandoned. This application June 23, 1975, Ser. No. 588,101

The portion of the term of this patent subsequent to Aug. 26, 1992, has been disclaimed.

Int. Cl.[2] A23L *2/02*

U.S. Cl. 426—598 **37 Claims**

1. Process for preparing a bland, stable aqueous dispersion of soybeans comprising:

i. heating soybean cotyledons sufficiently to inactivate the lipoxidase enzyme contained therein and to partially tenderize said soybean cotyledons,

ii. further tenderizing said soybean cotyledons unitl the soybeans exhibit a tenderometer value of between about 16 and about 300 pounds/100 grams of soybeans; and

iii. homogenizing an aqueous slurry of said tenderized soybeans, said slurry having a soybean concentration of less than about 20% by weight, in at least one pass through a homogenization zone at a pressure between about 1000 and 10,000 psi. at a temperature between about 32° F. and the boiling point of the slurry at the pressure within the homogenizing zone, thereby obtaining a bland, stable aqueous dispersion of soybeans.

4,041,188

FOOD COMPOSITION

Derek Cottier, London, and John Barry Rossell, Loughton, both of England, assignors to Lever Brothers Company, New York, N.Y.

Filed July 23, 1975, Ser. No. 598,454

Claims priority, application United Kingdom, July 26, 1974, 33176/74; July 26, 1974, 33175/74

Int. Cl.[2] A23D *5/00*

U.S. Cl. 426—607 **9 Claims**

1. Method of preparing a confectionery fat comprising selectively hydrogenating and blending first and second fats from different vegetable fat source, the first fat being a vegetable fat containing 10 to 40% by weight of disaturated glycerides of which two-thirds of the saturated fatty acids are palmitic acid and the second vegetable fat containing a lesser amount of such glycerides not exceeding 20%, the fats being blended in an amount of from 50 to 90% by weight of the first fat to 10 to 50% by weight of the second fat and selectively hydrogenated in the presence of a metl catalyst while retaining in the glycerides hydrogenated a single olefinic bond in each unsaturated fatty acid residue to provide a blend with a trans index of about 25, of an Iodine Value of 40 to 90 and a dilatation at 20° C of 1000 to 1800.

4,041,189

PRODUCTION OF EDIBLE PROTEIN CONTAINING SUBSTANCES

Peter John Towersey, High Wycombe; John Longton, Chesham, and Geoffrey Norman Cockram, Henley-on-Thames, all of England, assignors to Ranks Hovis McDougall Limited, London, England

Filed Sept. 18, 1974, Ser. No. 507,123

Claims priority, application United Kingdom, Sept. 24, 1973, 44708/73

Int. Cl.[2] C12B *1/00*

U.S. Cl. 426—656 **8 Claims**

7. An edible protein-containing substance obtained by maintaining cells of a grown non-toxic strain of Fusarium microfungus of the class Fungi Imperfecti in a suspension at a pH between 4.7 and 7.0 and at a temperature between 55 and 72° C for a time of at least 60 seconds and sufficient to reduce the nucleic acid content to below 4%.

4,041,190

METHOD FOR PRODUCING A SILICA MASK ON A SEMICONDUCTOR SUBSTRATE

Jean-Claude Dubois, and Maryse Gazard, both of Paris, France, assignors to Thomson-CSF, Paris, France

Continuation-in-part of Ser. No. 264,235, June 19, 1972, abandoned. This application Dec. 13, 1974, Ser. No. 532,691

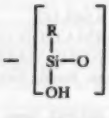
Claims priority, application France, June 29, 1971, 71.23624

Int. Cl.[2] B05D *3/06*

U.S. Cl. 427—43 **7 Claims**

1. A method of producing a precise silica insulating mask on predetermined areas of a semiconductor substrate, comprising the following steps:

1. depositing a thin film of an organic resin upon said semiconductor substrate, said resin consisting of polysiloxane of the structure:



where *n* is an integer ranging from 2 to about 30, and where R is an alkyl, aryl or alkenyl group;

2. irradiating and scanning said film by an electron beam, the width of the electron beam at the point of intersection with the surface of said resin of the order of 0.01 to 1 micron in diameter, according to a predetermined pattern of said mask thereby cross-linking and insolubilizing the exposed areas of said organic resin;

3. eliminating the non-irradiated areas of the film by means of a solvent and

4. thermally treating the irradiated film and substrate in a furnace and in an oxidizing atmosphere at a temperature ranging from 500 to 1000° C for about 2 hours, thereby converting the irradiated polysiloxane organic resin to a precise silica insulating mask impervious to penetration by a gas, liquid, or solid.

4,041,191

RESINS FOR USE AS ELECTRON RESISTS

Pierre Leclerc, and Jean Claude Dubois, both of 173 Bld Haussmann, 75008 Paris, France

Filed Nov. 6, 1975, Ser. No. 629,543
Claims priority, application France, Nov. 8, 1974, 74.37077
Int. Cl.[2] B05D *3/06*
U.S. Cl. 427—43 4 Claims

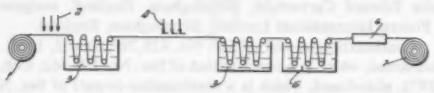
1. A resin for use as an electron resist comprising a random polymer of ethylene glycol monomethacrylate with triethylene glycol dimethacrylate, and randomly crosslinked, and having a degree of polymerization of from 10 to 1000.

4,041,192

METHOD OF ENHANCING HIGH POLYMERS, PARTICULARLY TEXTILES

Adolf Heger; Helmar Pässler, and Frank Bennemann, all of Dresden, Germany, assignors to VEB Textilkombinat, Cottbus, Germany

Filed Apr. 15, 1975, Ser. No. 568,245
Int. Cl.[2] B05D *3/06*
U.S. Cl. 427—43 43 Claims



1. A method of enhancing the properties and appearance of polymeric substances, particularly textiles, comprising treating a surface portion of a polymer so as to effect graft polymerization over substantially the entire extent of said surface portion in such a manner that variations in graft density occur across said surface portion, whereby the properties of said surface portion are enhanced due to graft polymerization over substantially the entire extent thereof and a textured appearance is imparted to said surface portion due to said variations in graft density, the treating step comprising grafting a substance over said surface portion substantially homogeneously, and said substantially homogeneous grafting comprising substantially homogeneously irradiating said surface portion so as to cause the formation of chemically active species and substantially homogeneously contacting said surface portion with a substance which undergoes a graft polymerization reaction with said species, the treating step also comprising grafting a substance over localized regions of said surface portion only, and said localized grafting comprising substantially homogeneously irradiating said surface portion so as to cause the formation of chemically active species, eliminating the latter in the regions of said surface portion other than said localized regions and substantially homogeneously contacting said surface portion with a substance which undergoes a graft polymerization reaction with the chemically active species in said localized regions.

4,041,193

METHOD FOR FANNING EACH SET OF MULTI-PLY SHEETS

Takao Hayashi, and Hiroharu Matsukawa, both of Fujimiya, Japan, assignors to Fuji Photo Film Co., Ltd., Minamiashigara, Japan

Filed Oct. 31, 1974, Ser. No. 519,734
Claims priority, application Japan, Oct. 31, 1973, 48-122542; Oct. 31, 1973, 48-122543
Int. Cl.[2] B41M *5/00*
U.S. Cl. 427—151 8 Claims

1. A method for fanning units comprising multi-ply sheets, which comprises applying an adhesive composition containing a sodium salt or potassium salt of naphthalenesulfonate-formaldehyde condensate to one side of a stack of multi-ply sheets and separating each unit of said sheets, wherein said naphthalenesulfonate-formaldehyde condensate is present in said composition in a proportion of about 5 to 40% by weight.

4,041,194

DECORATIVE COATING COMPOSITION FOR COATING GLASSWARE

Kennedy A. Jenkins, Washington, Pa., assignor to Hercules Incorporated, Wilmington, Del.

Filed Sept. 29, 1975, Ser. No. 617,608
Int. Cl.[2] C03C *17/32;* B05D *3/00*
U.S. Cl. 427—226 9 Claims

1. A thermofluid decorative coating composition consisting essentially of by weight

a. 20 to 50% of an essentially water-insoluble vehicle having a melt softening point range from about 45° to about 65° C. and

b. 80 to 50% of a particulate, non-vitrifiable filler material intimately dispersed in said vehicle,

said vehicle consisting essentially of by weight from 5 to 75% of at least one normally solid saturated aliphatic monohydric alcohol having 14 to 32 carbon atoms, 0 to 55% of paraffin wax, 0 to 40% of one or more polyalkylene glycols having an average molecular weight ranging from about 1500 to 20,000 in which the alkylene groups have 2 to 3 carbon atoms, 7 to 55% of at least one polystyrene having an average molecular weight ranging from about 200 to about 1200 and a softening point below 105° C., and 0 to 20% of one or more lower alkyl acrylate polymers having an inherent viscosity between about 0.2 and about 0.7, the sum of said alcohol, wax and polyalkylene glycol components being 45 to 77% of the vehicle and the sum of said polystyrene and acrylate polymer components being 23 to 55% of the vehicle.

4,041,195

MANUFACTURING PROCESS OF POROUS TUBULAR MEMBERS

Pierre Dussaussoy, Pantin, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Feb. 8, 1972, Ser. No. 224,638
Claims priority, application France, Feb. 16, 1971, 71.05158
Int. Cl.[2] B05C *7/14*
U.S. Cl. 264—60 7 Claims

1. Process for making porous tubular elements having two superposed coaxial layers, an external layer of rough texture and of high mechanical strength, and an internal layer of small radial thickness and fine texture, the steps of preparing a tubular shape of rough texture agglomerated by an organic binder, forming a thin layer of fine texture on a rigid core having a smaller external diameter than the internal diameter of the tubular shape, isostatically compressing the tubular shape for radial compression of the shape onto the rigid core, releasing the isostatic compression on the resulting assembly with radial expansion of the tubular shape and of the thin layer adhered thereto away from the rigid core, withdrawing the rigid core from the assembled tubular shape and thin layer and then baking the assembly.

4,041,196

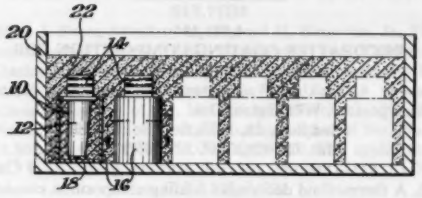
DIFFUSION TREATMENT OF METAL

Alfonso L. Baldi, Drexel Hill, Pa., and Victor V. Damiano, Pennsauken, N.J., assignors to Alloy Surfaces Company, Inc., Wilmington, Del.

Continuation-in-part of Ser. No. 507,126, Sept. 18, 1974, abandoned, and Ser. No. 466,908, May 3, 1974, Pat. No. 3,958,047, which is a continuation-in-part of Ser. No. 328,378, Jan. 31, 1973, Pat. No. 3,867,184. This application May 13, 1975, Ser. No. 576,981
Int. Cl.[2] C23C *9/00*
U.S. Cl. 427—252 6 Claims

1. In the chromizing of a superalloy article by diffusion coating the article in a chromium-containing powder pack at atmospheric or superatmospheric pressure to cause the surface

of the article to pick up at least 1 milligram of chromium per square centimeter, the improvement according to which the



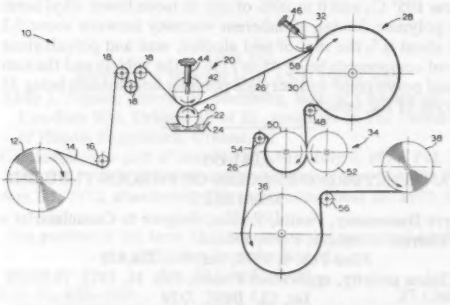
diffusion coating is effected with essentially no alpha-chromium formation by conducting it in an unperforated retort cup not over about 5 inches in height.

4,041,197

METHOD FOR COATING A SUBSTRATE WITH PLASTIC

Rudy L. Gagné, 998 Ingram Crescent, Midland, Ontario, Canada

Filed Dec. 29, 1975, Ser. No. 645,170
Claims priority, application Canada, Nov. 7, 1975, 239380
Int. Cl.[2] B05D *3/12, 1/28*
U.S. Cl. 427—278 **14 Claims**



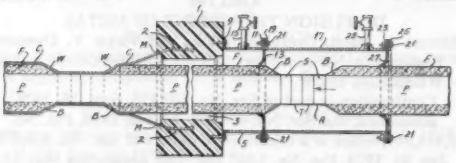
1. A method of producing a plastic coated substrate comprising: coating the substrate with a plastisol; providing a nip defined by a transverse put-on roll and a transverse heat drum for compressing the coated substrate; locating the substrate in said nip; smoothing and spreading the plastisol over the substrate by producing relative movement between the coated substrate and said nip; and heating the coated substrate in said nip to partially cure the plastisol.

4,041,198

APPARATUS AND METHOD FOR FORMING WATER STOPS ON INSULATED PIPE

Gerry E. McPherson, Houston, Tex., assignor to General Steel Industries, Inc., St. Louis, Mo.

Filed Oct. 1, 1975, Ser. No. 618,366
Int. Cl.[2] B05D *3/00*
U.S. Cl. 427—294 **9 Claims**



6. The method of applying protective plastic sheathing to an elongated generally cylindrical workpiece having alternating large and small diameter sections, comprising the steps of passing the workpiece through a first annular sealing flap of flexible material into a first passageway of larger diameter than the maximum diameter of the workpiece and thence through a second annular sealing flap of flexible material into a second passageway of larger diameter than the maximum diameter of the workpiece, the distance between the sealing flaps being sufficient that at all times at least one of the sealing flaps is in sealing engagement with a large diameter section of the workpiece, applying a vacuum to the chamber defined by said first and second flaps, the first passageway and the exterior surface of the workpiece, passing the workpiece through an extrusion die annularly spaced from and surrounding the workpiece and forming the outlet end of said second passageway, extruding plastic sheathing material from the extrusion die onto the workpiece and applying a vacuum to the chamber defined by the second annular sealing flap, the second passageway, the outer surfaces of the workpiece, and the annular portion of the plastic sheathing material between the outer surface of the workpiece and the outlet of the extrusion die to draw the extruded plastic material into close conformity with the exterior surface of the workpiece including the minimum diameter portions thereof.

4,041,199

REFRACTORY HEAT-INSULATING MATERIALS

John Edward Cartwright, Birmingham, England, assignor to Foseco International Limited, Birmingham, England

Continuation-in-part of Ser. No. 429,799, Jan. 2, 1974, abandoned, which is a continuation of Ser. No. 189,462, Oct. 14, 1971, abandoned, which is a continuation-in-part of Ser. No. 860,398, Sept. 23, 1969, abandoned. This application Dec. 4, 1975, Ser. No. 637,522
Int. Cl.[2] F16L *59/02;* **C04B** *35/52, 35/14, 35/02*
U.S. Cl. 428—36 **6 Claims**

1. A refractory heat-insulating material consisting essentially of 45–75% by weight of aluminosilicate fibre; 1–20% by weight of an element selected from the class consisting of aluminium, magnesium and silicon in particulate form; 0–25% by weight of a particulate refractory filler; and 2–16% by weight of a binding agent consisting of starch and a colloidal silica binder prepared by drying a colloidal silica sol.

6. A slab or sleeve suitable for use as a lining for a riser, feeder head, hot top or mould in the casting of steel comprising a refractory heat-insulating material consisting of 45–75% of its weight of aluminosilicate fibre, the remainder of the material consisting essentially of an element selected from the groups consisting of aluminium, magnesium and silicon in particulate form and present in an amount of 1–20% by weight and 2–16% by weight of a binding agent consisting of starch and colloidal silica binder prepared by drying a colloidal silica sol binder.

4,041,200

STACK OF TILES WHICH HAVE A RELEASE LAYER ON ONE MAJOR FACE AND AN ADHESIVE LAYER ON THE OPPOSED MAJOR FACE DOES NOT REQUIRE DISPOSABLE RELEASE INTERLAYERS

Armen G. Boranian, New Windsor, and Walter C. Timm, Newburgh, both of N.Y., assignors to GAF Corporation, New York, N.Y.

Filed Dec. 11, 1975, Ser. No. 639,839
Int. Cl.[2] B05D *5/10;* **B32B** *7/14, 31/12;* **E04F** *13/20, 15/10*
U.S. Cl. 428—40 **13 Claims**

1. A verticle stack of rigid vinyl tiles each of which has pressure sensitive adhesive adhered to one surface thereof and release agent for said adhesive adhered to the opposite surface thereof with individual tiles in such stack being substantially in the horizontal plane and the lowermost tile in each such stack being subjected to a pressure between about 30 and about 500 lbs. per square foot.

9. A process for making and packaging rigid vinyl tile comprising:

a. forming a plurality of pieces of rigid vinyl tile, each of said pieces having pressure sensitive adhesive adhered to one

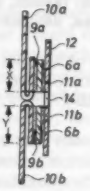
surface thereof and a release agent for said adhesive adhered to the opposite surface thereof; and

b. stacking said pieces for storage in such a manner that at least a majority of the surfaces of said pieces having adhesive adhered thereto are in direct contact with surfaces of said pieces having release agent adhered thereto.

4,041,201
ADHESIVE STRIP SET FOR SPLICING FILM STRIPS

Carl H. Würker, D 7239 Oberndorf-Aistaig, Schwarzwald, Germany

Filed Nov. 14, 1975, Ser. No. 632,058
Claims priority, application Germany, Nov. 16, 1974, 7438280
Int. Cl.² G03D *15/04*
U.S. Cl. 428—40 **6 Claims**



1. An adhesive strip set for splicing abutting ends of motion picture film strip portions of the type having sprocket holes and having sound track and compensating track locations along opposite edges of one surface thereof comprising

a first foil to be adhered to the surface of the film strip portions having the sound and compensating track locations

a second foil to be adhered to the opposite surface of the film strip portions,

each of said first and second foils having a coating of pressure-sensitive adhesive on each surface thereof,

the width of said first foil being less than the distance between the sound and compensating track locations;

first and second separate, releasable masking strip means releasably adhered to coatings on one side of each of said first and second foils, respectively, for covering the adhesive coatings on the surfaces thereof which are to be placed adjacent the film strip portions, said first and second strip means being more easily releasable from said coatings than are said foils;

a third holding and masking strip releasably adhered to the coatings on the opposite surfaces of both of said first and second foils, the coatings adhering said third strip being removable from said foils with said third strip; and

means defining apertures in said third strip, said apertures being longitudinally arranged in said third strip between said first and second foils to permit alignment of said strip set with the sprocket holes in the film so that one of said foils is properly positioned adjacent one surface of the film,

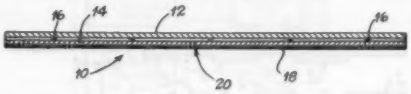
said third means being foldable along line parallel with said apertures to position the other one of said foils adjacent the opposite surface of the film.

4,041,202
STRIPPABLE TAPE

Robert E. Williams, 5812 Five Oaks Parkway, St. Louis, Mo. 563127

Continuation-in-part of Ser. No. 72,348, Sept. 15, 1970, abandoned. This application Mar. 7, 1973, Ser. No. 339,379
Int. Cl.² B32B *3/10*
U.S. Cl. 428—138 **13 Claims**

1. In a laminated, strippable tape for joining separable parts of an object: an upper strength layer and a bottom layer, the layers being of strip material adhered together substantially throughout their common width; adhesive on the bottom of the bottom layer of strip material by which the tape may be adhered to the object, the bottom layer also having a narrow medial slit of predetermined direction at least substantially through the thickness thereof leaving a line of separation between the lateral components of the layer not substantially wider than a conventional carton joint, whereby when the bottom layer is adhered to the separate parts of the object across a joint, the tape is bonded to the parts substantially from side to side of the tape; the bottom layer of the tape being paper

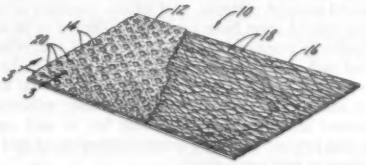


of a low internal bond material that is internally delaminatable and the strength layer being of a material stronger than the bottom layer and resistant to internal delamination, so that when the tape is adhered to the object, and is pulled away therefrom, the bottom layer becomes internally delaminated by the lifting of the strength layer with part of the bottom layer, leaving no more than a delaminated portion of the bottom layer that is medially separated by the slit into separate parts, so that the joined parts of the object are then freed from each other.

4,041,203
NONWOVEN THERMOPLASTIC FABRIC

Robert J. Brock, Neenah, and Gary H. Meitner, Winneconne, both of Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Continuation-in-part of Ser. No. 460,363, April 12, 1974, abandoned, which is a continuation-in-part of Ser. No. 286,691, Sept. 6, 1972, abandoned. This application Oct. 4, 1976, Ser. No. 729,356
Int. Cl.² B32B *27/00*
U.S. Cl. 428—157 **26 Claims**



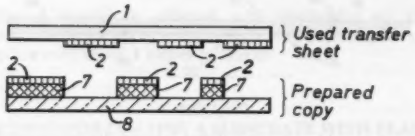
1. A nonwoven fabric-like material comprising a web of substantially continuous and randomly deposited, molecularly oriented filaments of a thermoplastic polymer having an average filament diameter in excess of about 12 microns and an integrated mat of generally discontinuous, thermoplastic polymeric microfibers having an average fiber diameter of up to about 10 microns and a softening temperature of about 10°–40°C. less than the softening temperature of the continuous filaments; said web and mat being positioned in laminar surface-to-surface relationship and united together at intermittent discrete bond regions formed by the application of heat and pressure to thereby provide a unitary structure having desirable textile-like appearance and drape characteristics and to integrate the web of substantially continuous filaments so that said web can function as an effective load bearing constituent of the material during straining thereof.

4,041,204

DRY TRANSFER SHEETS

Martin Hepher, Berkhampstead; John Arthur Sperry, Chalfont St. Peters, and Malcolm John Stewart, London, all of England, assignors to The Autotype Company Limited, London, England

Filed Jan. 18, 1974, Ser. No. 434,595
Claims priority, application United Kingdom, Jan. 18, 1973, 2685/73; Feb. 1, 1973, 5177/73
Int. Cl.[2] B32B *3/00, 7/06*
U.S. Cl. 428—199 7 Claims



1. In a dry transfer sheet, which comprises a transparent or otherwise translucent carrier sheet, and photographically-produced pressure-transferable stencil images of letters, numbers or other indicia disposed upon one side of the carrier sheet, the stencil images being formed of a photo-polymerizable or photo-crosslinkable film derived from a photo-sensitive layer provided upon the carrier sheet and subjected to photographic exposure and development in conjunction with an original of the indicia, such photosensitive layer and the stencil images derived therefrom containing an adhesive substance capable of providing the stencil images with a pressure-sensitive adhesive property; the improvement comprising, between the carrier sheet and the stencil images carried thereby, a layer of a temporary keycoat material which provides adhesion between the carrier sheet and the photosensitive layer in the dry state and during processing, the temporary keycoat material remaining on the carrier sheet during development, the temporary keycoat material further having the properties, upon transfer of a stencil image from the carrier sheet, of separating from the sheet only directly over the selected letter, number or other indicium and adhering sufficiently to the stencil image to transfer with it, whereby the temporary keycoat material lowers the surface tack of the transferred stencil image, the remainder of said keycoat material remaining on said carrier sheet, the transferred keycoat material thereafter precluding penetration of the adhesive material from the transferred stencil image into the transferred keycoat material, said letters, numbers or other indicia being spaced apart from each other thereby to be selectively individually transferable, and a copy sheet that receives a transferred said stencil image, said transferred image having a greater adhesion to said copy sheet than said keycoat has to said carrier sheet, said keycoat having a greater adhesion to said transferred image than said keycoat has to said carrier sheet, and said keycoat having a greater adhesion to said carrier sheet than to said copy sheet.

4,041,205

RESIDUE-FREE FABRIC SOFTENING ARTICLE FOR USE IN LAUNDRY DRYER

Russell Edward Compa, West Orange; Marvin Liebowitz, Edison, and Ralph Paul Messina, Somerset, all of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Filed Oct. 18, 1973, Ser. No. 407,477
Int. Cl.[2] D06M *13/00*
U.S. Cl. 428—220 11 Claims

1. A solid fabric softening and conditioning article in the form of a sheet with a surface to volume ratio of 20:1 to 400:1 which comprises, by weight 10–99% of at least one fabric softening compound selected from the group consisting of cationic, non-ionic, anionic, and zwitterionic fabric softening compounds and as a reinforcing material for such compound 1–40% of finely divided cellouse, microcrystalline protein or nylon fibers of a length of 0.005 to 0.1 mm and a diameter of 0.001 to 0.01 mm to prevent premature disintegration of the article during use in the softening of moving fabrics in the drying zone of an automatic laundry dryer by contact of the article with them to transfer softening agent to them, which reinforcing material gradually disintegrates during use of the softening article and leaves no residue in the drying zone after use thereof.

4,041,206

LAMINATED POLYESTER FILM

Kenji Tsunashima, Kyoto; Masanao Sugioka; Atsuhiko Soda, both of Otsu; Hiroyuki Ikeuchi, and Michihiko Tanaka, both of Ehime, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Continuation-in-part of Ser. No. 447,578, March 3, 1974, abandoned. This application Dec. 18, 1975, Ser. No. 642,182
Int. Cl.[2] B32B *27/36, 7/10, 31/20, 31/26*
U.S. Cl. 428—409 5 Claims

1. A laminated polyester film having improved heat-adhesive strength and slipperiness consisting essentially of a biaxially oriented layer of a terephthalate polymer selected from the group consisting of polyethylene terephthalate and polybutylene terephthalate.

said biaxially oriented terephthalate polymer having at least one surface laminated directly by heat-sealing and without any added adhesive layer to an axially oriented crystalline copolyester layer, the number of axes of orientation being 1 to 2,

said crystalline copolyester layer containing from about 10 to 40 weight % of a terephthalate polymer selected from the group consisting of polyethylene terephthalate and polybutylene terephthalate,

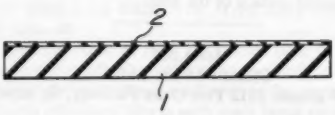
said crystalline copolyester being selected from the group consisting of butylene terephthalate isophthalate copolyester and hexylene terephthalate isophthalate copolyester, and consisting essentially of from about 50 to 80 mole % of terephthalate units based upon the total number of moles of acid components of the copolyester.

4,041,207

HEAT RESISTANT RUBBER LAMINATES

Tsutomu Takada, Yokohama; Shingo Kato, Tokyo; Tadashi Utsunomiya, Yokohama, and Sakae Inoue, Kodaira, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Filed Oct. 7, 1976, Ser. No. 730,397
Claims priority, application Japan, Oct. 7, 1975, 50-120244
Int. Cl.[2] B32B *27/00*
U.S. Cl. 428—421 18 Claims



1. A heat resistant rubber laminate composed of a base layer consisting mainly of a heat resistant rubber composition and a heat resistant top cover, wherein said heat resistant top cover being a rubber composition consisting mainly of ethylene-fluoropropylene copolymeric rubber.

4,041,208

TRANSPARENT, IMPACT-RESISTANT POLYESTERURETHANE LAMINATES

Nelson V. Seeger, Cuyahoga Falls, and Andrew J. Kaman, Norton, both of Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 154,944, June 21, 1971, abandoned, and Ser. No. 242,347, April 10, 1972, abandoned. This application May 21, 1974, Ser. No. 472,019
Int. Cl.[2] B32B *27/40*
U.S. Cl. 428—424 26 Claims

1. An optically-clear, energy-absorbing laminate, comprising at least one glass sheet bonded to a sheet of a substantially unreacted isocyanate free, thermoplastic, transparent polyesterurethane that is the reaction product of (a) essentially linear hydroxy-terminated polyester having a liquidus temperature of at least 44° C., said polyester being selected from the group consisting of poly(1,4-butylene adipate) and poly(1,4-butylene azelate) having a molecular weight of about 2000, (b) 4,4'-methylene-bis-(cyclohexyl isocyanate), and (c) aliphatic diol containing from 4 to 8 carbon atoms, the mole ratio of (c) to (a) being from about 1.5:1 to about 5:1, the isocyanate groups provided by (b) being substantially numerically equivalent to the sum of hydroxyl groups provided by (c) and (a) whereby to provide a polyesterurethane that is substantially free of unreacted isocyanate groups, said mole ratio of (c) to (a) being so proportioned within said range that a rigidly held laminate prepared from about 0.030 inch thick sheeting of said polyesterurethane sandwiched between two 12 × 12 × $\frac{1}{4}$ inch glass sheets is non-brittle at 0° F. and exhibits a mean penetration velocity of at least 20 miles per hour at laminate temperatures of 0° F. and 70° F., and a mean penetration velocity of at least 17 miles per hour at a laminate temperature of 120° F. when impacted with a five pound free falling steel ball.

4,041,209

MULTIPLE WALL PACKAGING MATERIAL CONTAINING SULFITE COMPOUND

William R. Scholle, Compton, Calif., assignor to Scholle Corporation, Northlake, Ill.

Continuation-in-part of Ser. No. 544,587, Jan. 27, 1975, abandoned. This application Nov. 26, 1976, Ser. No. 745,238
Int. Cl.[2] B65D *81/28;* B32B *27/32, 21/06*
U.S. Cl. 428—500 3 Claims

1. A structural multiple ply wall for a product container, said wall comprising:

an inner container sheet ply selected from the group consisting of cellulosic and polymeric materials having a composition providing low product permeability through said ply for a product disposed adjacent to a first face of said ply;

a fluid coating having an oxygen scavenger composition actively providing removal of oxygen from a gaseous atmosphere contacting said fluid coating, said fluid coating disposed adjacent to the second face of said inner sheet ply, said oxygen scavenger composition having disposed therein at least one compound comprising water soluble salts of sulfite ion (SO_3^{--}), bisulfite ion (HSO_3^-), meta bisulfite ion ($S_2O_5^{--}$), hydrosulfite ion ($S_2O_4^{--}$); and

at least one sheet exterior ply consisting of polymeric material having one face of one said exterior ply disposed adjacent to said fluid coating;

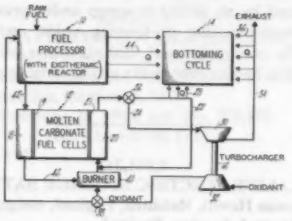
said inner ply, said fluid coating, and said at least one sheet exterior ply being contiguously integrally disposed together, forming said structural multiple ply wall, said wall being suitable for providing at least the major proportion of the container wall area.

4,041,210

PRESSURIZED HIGH TEMPERATURE FUEL CELL POWER PLANT WITH BOTTOMING CYCLE

Leslie L. Van Dine, Manchester, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Aug. 30, 1976, Ser. No. 719,049
Int. Cl.[2] H01M *8/06*
U.S. Cl. 429—16 30 Claims



1. A fuel cell power plant comprising:

a plurality of molten carbonate fuel cells connected electrically in series, each cell including means defining a fuel space and means defining an oxidant space;

turbocharger means including first turbine means operably connected to a compressor for driving said compressor;

second turbine means operably connected to an electric generator;

burner means disposed downstream of said fuel space for burning fuel space effluent;

means for delivering pressurized, processed fuel into said fuel space including fuel processing apparatus disposed upstream of said fuel space;

means for delivering raw fuel into said fuel processing apparatus;

means for delivering pressurized oxidant from said turbocharger means and effluent from said fuel space into said burner means;

means for delivering effluent from said burner means into said oxidant space;

means for dividing the oxidant space effluent into a first portion and a second portion and for recycling said first portion through said oxidant space and for delivering said second portion into said first turbine means for driving said compressor; and

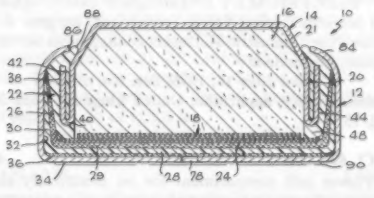
means for transferring heat energy from the oxidant space effluent to said second turbine means to drive said electric generator, including means for transferring heat energy from the first turbine means exhaust gases to said second turbine means.

4,041,211

PRODUCTION OF ZINC-AIR BUTTON CELL

Marian Wiacek, Montreal, Canada, assignor to Unican Electrochemical Products Ltd., Montreal, Canada

Filed Oct. 6, 1975, Ser. No. 620,107
Int. Cl.[2] H01M *2/08*
U.S. Cl. 429—36 29 Claims



1. A metal-air cell which comprises an outer metal can and

an inner metal can disposed within said outer metal can, said inner can containing electrode material, a downwardly tapered polymeric seal between the outer wall of said inner can and the inner wall of said outer can, a catalyst electrode positioned between said seal and the inner wall of said outer can, a separator between said electrode material and said catalyst electrode, and a pressure sensitive coating on the outer wall of said inner can and disposed between said outer wall and said seal, said pressure sensitive coating being an alkali resistant elastomer characterized by an ability to creep under pressure substantially without cracking or forming voids, and providing a substantially continuous seal, said elastomer coating forming an elastic film having rubber-like characteristics and remaining resilient.

4,041,212

ALKALINE ELECTRIC STORAGE BATTERIES

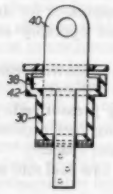
Albert Thomas Hewitt, Redditch, England, assignor to Chloride Group Limited, London, England

Filed May 18, 1976, Ser. No. 687,599

Claims priority, application United Kingdom, May 21, 1975, 21937/75

Int. Cl.² H01M 2/26

U.S. Cl. 429—89 **12 Claims**



1. An electric storage battery of alkaline electrolyte type, comprising:

a case accommodating at least one cell, said cell including plates of each polarity;

a lid covering said case and including at least one elongated slot and a respective supporting surface at each end of said slot;

at least one pair of plate straps, each plate strap respectively interconnecting said plates of each polarity; and

at least one pair of metal strip connectors, each connector extending above said lid for respective external connection to the plates of each polarity and extending downwardly through said elongated slot, the lower end of each said connector being secured to the associated plate strap and including an ear projecting respectively from its opposite edges and resting on said supporting surfaces to support the weight of said electrode plates within said case.

4,041,213

POWER CELL COMPARTMENT FOR AN ELECTRICALLY ENERGIZED TIMEPIECE

Henri Schneider, Mont Soleil, Switzerland, assignor to Societe Suisse Pour l'Industrie Horlogere Management Services S.A., Bienne, Switzerland

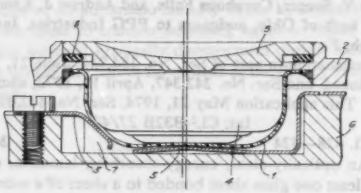
Filed June 18, 1976, Ser. No. 697,665

Claims priority, application United Kingdom, June 30, 1975, 27512/75

Int. Cl.² H01M 2/06

U.S. Cl. 429—98 **4 Claims**

1. Power cell compartment for an electrically energized timepiece wherein an envelope formed from an anisotropically conductive elastomer partially encloses the power cell and is fixed to the timepiece casing so as to provide a mechanical seal between the movement compartment and the power cell compartment and to assure electrical connection between the movement contacts and the power cell electrodes.



4,041,214

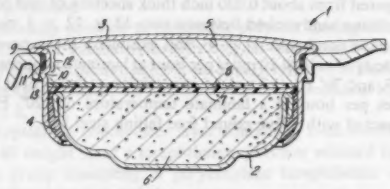
BUTTON CELL CONFIGURATION

Jean Claude Salin, Besancon, France, assignor to Timex Corporation, Waterbury, Conn.

Filed May 20, 1976, Ser. No. 688,457

Int. Cl.² H01M 2/10

U.S. Cl. 429—98 **2 Claims**



1. An improved energy cell for a watch or hearing aid having a case with an opening for inserting the cell therein, wherein the improvement comprises:

an outer container for said cell having a retaining ledge portion having a first circumference,

flange means having a circumference less than said first circumference and having a concave portion for flexing to exert a pressure against the case when said cell is inserted into the opening in the case for holding said cell in the opening of the case, and

gasket means affixed between said retaining ledge portion and said flange means for forming a seal between the opening in the case and the cell whereby dust and moisture are substantially prevented from entering into the interior of the case.

4,041,215

METHOD FOR FORMING SOLID ELECTROLYTE COMPOSITE

Kenneth R. Kormanyos, Rossford; Howard L. McCollister, and Paul L. White, both of Toledo, all of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

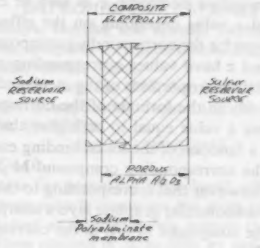
Filed Apr. 5, 1976, Ser. No. 673,784

Int. Cl.² H01M 2/16

U.S. Cl. 429—104 **9 Claims**

1. A method for forming a solid electrolyte composite having a porous crystalline alpha-Al_2O_3 exposed portion and an exposed ionic conductive crystalline sodium polyaluminate membrane portion comprising: contacting a surface of a porous, anhydrous, crystalline body consisting of alpha-Al_2O_3 with a precursor which on a dry oxide basis substantially corresponds to a sodium polyaluminate composition and heat-

ing said contacted surface at a temperature and for a time sufficient to convert the precursor to a crystalline ionic conductive membrane of sodium polyaluminate and form said composite.

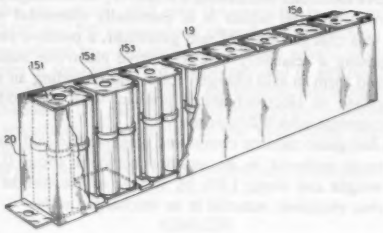


4,041,216

SODIUM-SULPHUR BATTERY, MORE PARTICULARLY FOR ELECTRICAL DRIVE

Gérard Desplanches, Villejust; Yvon Lazennec, St Michel sur Orge, and Alain Wicker, Limours, all of France, assignors to Compagnie Generale d'Electricite S.A., Paris, France

Filed Mar. 2, 1976, Ser. No. 663,027
Claims priority, application France, Mar. 17, 1975, 75.08258
Int. Cl.[2] H01M 6/18
U.S. Cl. 429—104 **10 Claims**



1. A battery comprising:

a plurality of cells; each cell comprising:

a cathode tank containing a cathode reagent which is liquid at operating temperature and is chosen from the group formed by the elements of sulphur, phosphorous, selenium, and alkyline salts of those elements,

a solid electrolyte tube partially immersed in the cathode reagent; said tube being closed at its lower end and open at its upper end and containing a sodium anode reagent which is liquid at the operating temperature, the wall of the tube being made of alkaline beta alumina,

a ceramic insulating support supporting the electrolyte tube in the cathode tank, and a glass seal between the support and the tube,

an anode tank containing a supply of the anode reagent and mounted above the cathode tank, so that the upper end of the electrolyte tube opens into the anode tank, said support separating the open ends of the anode and cathode tanks;

means connecting sets of *p* cells of said plurality of cells in parallel and comprising:

a first conductive plate connected to the anode tank tops of each set of *p* cells, and

a second conductive plate connected to the cathode tank bottoms of each set of *p* cells so that the cells in each set are separated from each other by a common space,

each of said first and second plates containing an aperture in communication with said common space; and

a conductive strap joining each first plate with the second plate of an adjacent set of *p* cells so that the sets of cells are connected electrically in series to form a group of series connected sets of cells, said strap being substantially perpendicular to the first and second plates of adjacent cells.

4,041,217

THERMAL BATTERY WITH METAL-METAL OXIDE HEATING COMPOSITION

William H. Collins, Timonium, Md., assignor to Catalyst Research Corporation, Baltimore, Md.

Filed June 23, 1964, Ser. No. 378,489
Int. Cl.[2] H01M 6/36
U.S. Cl. 429—112 **7 Claims**

1. A thermal battery comprising a plurality of cells, said cells comprising a metallic positive electrode and a metallic negative electrode spaced by a normally inactive electrolyte that becomes electrically active when heated, a combustible composition disposed between said cells and in contact therewith for supplying heat to the electrolyte, means for igniting said composition, said composition comprising an intimate mixture of a finely divided metal oxide and a finely divided metal capable of exothermically reacting with said metal oxide to form an electrically conductive metal oxide reaction product, thereby forming an electrically conductive ash when burned and providing an electrical connection between said cells.

4,041,218

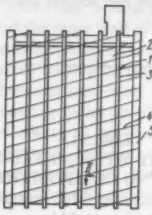
SEPARATOR FOR ALKALINE STORAGE BATTERIES

Shoya Samuilovich Axelrod, prospekt Energetikov, 46, korpus 1, kv. 215, Leningrad; Viktor Grigorievich Belozerov, ulitsa Mendeleeva, 53, kv. 71, Kursk; Mikhail Bentsionovich Gershman, prospekt Kima, 30, kv. 25, Leningrad; Evel Grigorievich Margolin, Svetlanovsky prospekt, 62, korpus 1, kv. 233, Leningrad, and Mikhail Borisovich Shapot, Shkolnaya ulitsa, 64, kv. 7, Leningrad, all of U.S.S.R.

Filed Jan. 7, 1976, Ser. No. 647,460
Int. Cl.[2] H01M 2/18
U.S. Cl. 429—136 **5 Claims**

1. A separator for alkaline storage batteries comprising a reticular flexible envelope formed by a first group of parallel

rods, and a second group of rods arranged with an inclination relative to said first group of rods and being secured thereto,



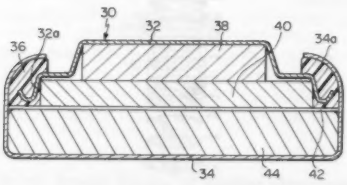
and the rods of said first group of said rods having a greater thickness than the rods of said second group of said rods.

4,041,219

SILVER PEROXIDE-ZINC BATTERY

Hajime Nishimura, Tokyo, and Yasushi Nomura, Tokorozawa, both of Japan, assignors to Citizen Watch Company Limited, Tokyo, Japan

Filed Mar. 5, 1976, Ser. No. 664,075
Claims priority, application Japan, Dec. 12, 1975, 50-148294
Int. Cl.[2] H01M *10/32*
U.S. Cl. 429—144 **11 Claims**



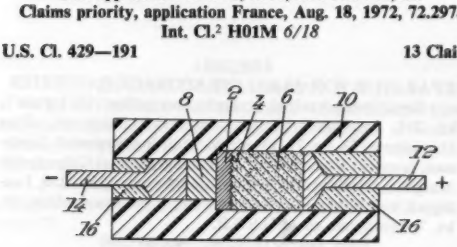
1. A silver peroxide-zinc battery comprising a positive active material, zinc as a negative active material, and an electrolyte, said positive active material consisting essentially of silver peroxide and a proportion of an oxide of manganese.

4,041,220

MIXED CONDUCTORS OF GRAPHITE, PROCESSES FOR THEIR PREPARATION AND THEIR USE, NOTABLY FOR THE PRODUCTION OF ELECTRODES FOR ELECTROCHEMICAL GENERATORS, AND NEW ELECTROCHEMICAL GENERATORS

Michel B. Armand, Grenoble, France, assignor to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly-sur-Seine, France

Division of Ser. No. 389,617, Aug. 17, 1973, Pat. No. 3,956,194. This application Jan. 28, 1976, Ser. No. 653,181
Claims priority, application France, Aug. 18, 1972, 72.29734
Int. Cl.[2] H01M *6/18*
U.S. Cl. 429—191 **13 Claims**



1. Electrochemical generator comprising a negative electrode containing an alkali metal such as Li, Na, K, Rb or Cs either in the metallic state or in the form of an alloy with another metal, and an electrolyte permitting conduction of ions of said alkali metal, wherein the positive electrode contains a compound $M_{x_1}C_n(M'_yX_z)$ in which M is the same alkali metal as that of the negative electrode; x_1 is zero or comprised between zero and a value depending on the affinity of the selected alkali metal for the corresponding compound of formula $C_n(M'_yX_z)$; y and z have values corresponding to the indices defining the relative proportions of the metal and non-metallic atoms respectively in the formula of the corresponding product M'_yX_z n has a value equal to or higher than a minimum value which is a function of the initial binding energy between graphite and the corresponding compound M'_yX_z, this value not exceeding however that corresponding to the formation of continuous monomolecular graphite layers interposed between the layers of the compound M'_yX_z in the corresponding compound $C_n(M'_yX_z)$.

4,041,221

ZINC ELECTRODES AND METHODS OF MAKING SAME

Aldo S. Berchielli, Westerly, R.I., and Roland F. Chireau, Quaker Hill, Conn., assignors to Yardney Electric Corporation, Pawcatuck, Conn.

Filed July 27, 1976, Ser. No. 709,138
Int. Cl.[2] H01M *10/24*
U.S. Cl. 429—206 **8 Claims**

1. In a rechargeable electrochemical generator having a negative electrode comprising a relatively electronegative zinc electrode material which is in essentially elemental metallic form in a charged state of said generator, a positive electrode comprising a relatively electropositive electrode material in oxidized form in said charged state, and including an alkaline electrolyte in electrochemical contact with electrodes, the improvement which comprises:

an inorganic titanate compound dispersed in said zinc electrode material in an amount between about 0.2% by weight and about 1.8% by weight of the weight of said zinc electrode material in an uncharged state.

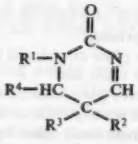
4,041,222

RUBBER MIXTURES HAVING IMPROVED SURFACE TACK

Hubert Schoeppl, Mannheim; Harro Petersen, Frankenthal; Gerhard Paulus, Weinheim, and Hubertus Queins, Friedelsheim, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Division of Ser. No. 493,779, Aug. 1, 1974, abandoned. This application Oct. 14, 1975, Ser. No. 622,251
Claims priority, application Germany, Aug. 13, 1973, 2340048
Int. Cl.[2] C08K *5/34*
U.S. Cl. 526—6 **1 Claim**

1. Rubber mixtures containing from 1 to 20 parts of a 2-oxotetrahydropyrimidine for every 100 parts of rubber wherein said 2-oxotetrahydropyrimidines having the formula:



in which the radicals R^1 to R^4 each denotes hydrogen or alkyl of from 1 to 20 carbon atoms and may be the same or different.

4,041,223
PROCESS FOR PREPARING HYDROLYZED ETHYLENE-VINYL ACETATE COPOLYMER HAVING IMPROVED HEAT STABILITY

Kiyosi Amemiya, Ibaraki, and Hiroshi Takida, both of Takatsuki, Japan, assignors to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Aug. 26, 1975, Ser. No. 608,020
Claims priority, application Japan, Aug. 30, 1974, 49-100279; Sept. 5, 1974, 49-103380
Int. Cl.[2] C08F *8/12*
U.S. Cl. 526—10 6 Claims

1. A process for preparing hydrolyzed ethylene-vinyl acetate copolymers which comprises the steps of

a. hydrolyzing an ethylene-vinly acetate copolymer having an ethylene content of 20 to 50% by mole in an alcoholic medium in the presence of an alkaline metal catalyst to produce particles of hydrolyzed copolymer having a degree of hydrolysis in vinyl acetate units of more than 90% by mole,

b. separating said particles from the resulting hydrolysis reaction mixture and removing an alkali metal salt, wherein the alkali metal is selected from the group consisting of sodium and potassium which is included in the particles of the hydrolyzed copolymer to the extent that not more than 1.5% by weight based on the dry weight of the hydrolyzed copolymer of residual alkali metal salt remains in the copolymer,

c. contacting the particles obtained by the step (b) with an aqueous or alcoholic solution of a phosphoric acid selected from the group consisting of orthophosphoric acid, phosphorous acid and pyrophosphoric acid to incorporate the phosphoric acid into the particles in an amount of 0,001 to 0.5% by weight of phosphorus-containing radical calculated as $—PO_4$ radical to the dry weight of the particles of the hydrolyzed copolymer and of not less than an equal amount of weight to the residual alkali metal ion of the salt in the particles of the hydrolyzed copolymer,

d. separating the particles of the hydrolyzed copolymer from the mixture, and

e. drying the particles of the hydrolyzed copolymer.

4,041,224
CATALYST, METHOD AND POLYMERIZATION PROCESSES

Raymond E. Hoff, Palatine; Thomas J. Pullukat, Hoffman Estates, and Mitsuzo Shida, Barrington, all of Ill., assignors to Chemplex Company, Rolling Meadows, Ill.

Filed Nov. 19, 1975, Ser. No. 633,507
Int. Cl.[2] C08F *4/24, 10/00*
U.S. Cl. 526—96 36 Claims

1. A catalyst prepared by the process of (1) forming a mixture of a finely divided, difficultly reducible, support selected from the group consisting of silica, alumina, zirconia, thoria and mixtures thereof and a chromium compound, followed by (2) adding a titanium compound, then (3) heat activating said product of (2) in an inert or reducing atmosphere, and then (4) partially oxidizing by heating said product (3) in a gas that comprises oxygen.

4,041,225
POLYMERIZATION CATALYST AND METHOD

Thomas J. Pullukat, Hoffman Estates, Ill., assignor to Chemplex Company, Rolling Meadows, Ill.

Filed Dec. 29, 1975, Ser. No. 645,284
Int. Cl.[2] C08F *4/78, 10/00*
U.S. Cl. 526—96 33 Claims

1. The method of making an active catalyst consisting essentially of: ion exchanging (1) a chromium (III) amine complex onto (2) a support which is a finely divided, difficultly reducible, inorganic support of the class consisting of silica, alumina, thoria, zirconia, titania, magnesia and mixtures thereof substantially free of adsorbed water and having cations on the surface thereof; and (3) activating the resulting ion exchanged material by heating to and at an elevated temperature in a non-oxidizing atmosphere.

4,041,226
CHROMIUM TRIS-DIORGANO-ORTHOPHOSPHATE-ALKYL ALUMINUM HALIDE CATALYSTS FOR OLEFIN POLYMERIZATION AND ALKYLATION OF AROMATIC COMPOUNDS

Jeffrey G. Meyer, Adrian, Mich., assignor to Anderson Development Company, Adrian, Mich.

Division of Ser. No. 532,010, Dec. 12, 1974, Pat. No. 3,969,272, which is a continuation-in-part of Ser. No. 319,621, Dec. 29, 1972, Pat. No. 3,907,849. This application Nov. 24, 1975, Ser. No. 634,592
Int. Cl.[2] C08F *2/06, 4/62, 10/00*
U.S. Cl. 526—144 9 Claims

1. The method comprising

1. mixing at least two components from (A) a chromium tris-diorgano-orthophosphate of the formula $Cr[OP(O)(OR)_2]_3$ in which each R is selected from the class consisting of non-aromatic hydrocarbon groups free of aliphatic unsaturation and containing one to eight carbon atoms, non-aromatic hydrocarbon ether groups free of aliphatic unsaturation and containing three to six carbon atoms and chlorinated and brominated derivatives thereof, (B) an alkyl aluminum halide of the general formula R'_cAlX_d in which each R' is an alkyl group of one to six carbon atoms, each X is a halogen atom, each *c* and *d* is 1 or 2 and the total of *c* and *d* is 3, the mol ratio of (A) to (B) ranging from 1:1 to 1:20, and (C) at least one aliphatic, cycloaliphatic and/or aromatic olefin containing no more than about 20 carbon atoms;

2. adding the remaining component, if any, the mol ratio of total (A) and (B) to (C) ranging from 0.0001:1 to 0.01:1;

3. heating the mixture at a temperature and for a time sufficient to initiate the reaction of component (C); and separating the resulting product from the reaction mixture.

4,041,227
CLEAVABLE BRANCHING AGENTS IN EMULSION POLYMERIZATION SYSTEMS

Carl A. Uraneck, and Paul W. Solomon, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Nov. 25, 1975, Ser. No. 635,002
Int. Cl.[2] C08F *2/16, 2/22, 2/38*
U.S. Cl. 526—190 23 Claims

1. As compositions of matter, polymers of a conjugated diene monomer, or of a conjugated diene monomer with a vinyl comonomer, prepared by the aqueous emulsion polymerization of said monomer in the presence of a free radical initiator, emulsifier, molecular weight modifier, aqueous medium, and a minor effective amount of bis(1,3-dienyl)dialkyltin, -lead, or -germanium branching agent,

wherein said bis(1,3-dienyl)dialkyltin, -germanium, or -lead, branching agent is represented by the formula:

wherein each D represents an acyclic hydrocarbyl conjugated dienyl radical, or a ring-substituted styryl; wherein each R is a hydrocarbyl radical and is alkyl or cycloalkyl, and wherein M represents said tin, germanium, or lead.

4,041,228

ABSORBENT ARTICLES AND METHODS FOR THEIR PREPARATION

James Richard Gross, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 468,794, May 9, 1974, Pat. No. 3,980,663, which is a continuation-in-part of Ser. No. 371,909, June 20, 1973, abandoned. This application May 9, 1975, Ser. No. 576,053

Int. Cl.[2] C08F *8/42*

U.S. Cl. 526—240 **9 Claims**

1. A method of preparing substantially water swellable polyelectrolyte fibers which comprises

A. extruding a composition comprising

1. a solution of a carboxylic synthetic polyelectrolyte wherein the solution comprises water, lower alcohols, or mixtures thereof and about 5 to about 60% by weight of a carboxylic polyelectrolyte, and
2. at least about 0.1% by weight based on the polyelectrolyte of a crosslinking agent reactive with carboxylate groups into a bath comprising lower alkyl ketones or chlorinated hydrocarbons to form an extruded fiber,

B. separating the extruded fiber from said bath, and

C. heating said fibers to a temperature greater than about 30° C to crosslink said polyelectrolyte fibers.

4,041,229

POLYMERIC FLUOROMETHYLATED DIENES

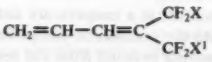
Victor A. Pattison, Clarence Center, N.Y., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Continuation-in-part of Ser. No. 656,219, Feb. 9, 1976, Pat. No. 4,004,073, which is a continuation of Ser. No. 411,869, Nov. 1, 1973, abandoned, which is a continuation-in-part of Ser. No. 788,009, Dec. 30, 1968, abandoned. This application Nov. 8, 1976, Ser. No. 739,760

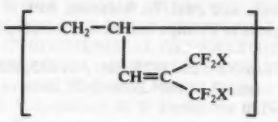
Int. Cl.[2] C08F *136/16, 136/18*

U.S. Cl. 526—249 **14 Claims**

1. A copolymer of a halomethylated diene of the formula



wherein X and X[1] are halogen and a monomer copolymerizable therewith, said copolymer being characterized by the repeating units



in the skeletal chain, and produced by the process comprising allowing said halomethylated diene and said copolymerizable monomer to copolymerize by the use of a free radical catalyst.

4,041,230

FLAMEPROOFED MODACRYLIC COPOLYMERS OF UNSATURATED CARBOXY-PHOSPHINIC ACID DERIVATIVES

Bernd Huber, Hofheim, Taunus, and Hans-Jerg Kleiner, Kronberg, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

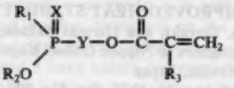
Filed Oct. 17, 1975, Ser. No. 623,335

Claims priority, application Germany, Oct. 19, 1974, 2449469; Oct. 19, 1974, 2449466

Int. Cl.[2] C08F *30/02, 230/02, 26/06, 4/30*

U.S. Cl. 526—278 **5 Claims**

1. A modacrylic copolymer of 35 to 85% by weight of acrylonitrile, 5 to 45% by weight of vinyl chloride, vinyl bromide, vinylidene chloride or a mixture thereof and 5 to 30% by weight of a carboxy phosphinic acid of the formula



wherein R_1 and R_2 are alkyl or haloalkyl radicals having a total of up to 8 carbon atoms; R_3 is hydrogen or methyl; X is oxygen or sulfur; Y is linear or branched alkylene having up to 6 carbon atoms, and 0 to 15% by weight of other unsaturated compounds with activated double bond.

4,041,231

WATER SWELLABLE ARTICLES

James R. Gross, Lake Jackson, and Russell T. McFadden, Freeport, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 450,650, March 13, 1974, Pat. No. 3,926,891. This application June 30, 1975, Ser. No. 591,732

Int. Cl.[2] C08F *22/38*

U.S. Cl. 526—317 **8 Claims**

1. A method of preparing substantially water swellable polyacrylate fibers which comprises

A. extruding a solution into a bath comprising lower alkyl ketones or chlorinated hydrocarbons to form an extruded fiber wherein said solution is prepared by forming a polyacrylate solution having about 30 to about 70 weight percent alkali metal carboxylates by dissolving in an aqueous alkali metal hydroxide solution a polyacrylate comprising

1. about 30 to about 92 percent by weight of an alkyl acrylate wherein the alkyl group has 1–10 carbon atoms, an alkyl methacrylate wherein the alkyl group has 4–10 carbon atoms, or mixtures thereof,
2. about 8 to about 50 percent by weight of an olefinically unsaturated carboxylic acid, and
3. about 0 to about 15 percent by weight of an omega hydroxy-alkyl acrylate having 1–4 carbon atoms in the hydroxy alkyl group heating the solution until saponification is complete, and adding to said solution about 0.1 to about 10 weight percent, based on the dissolved polymer, of a water soluble crosslinking agent which is reactive with carboxylate salt groups,

B. separating the extruded fiber from said bath, and

C. heating said fibers to a temperature greater than about 30° C to crosslink said polyacrylate.

4,041,232

AMPHOTERICIN B METHYL ESTER SALTS

Frank Sipos, Princeton, and Adam J. Keseleski, Edison, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Feb. 23, 1976, Ser. No. 660,598

Int. Cl.[2] C07H *17/08*

U.S. Cl. 536—17 **10 Claims**

1. A salt of the methyl ester of amphotericin B, said salt being selected from mono and dicarboxylic amino acid salts of the methyl ester of amphotericin B.

4,041,233

ALDEHYDE-CONTAINING UREA-ABSORBING POLYSACCHARIDES

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of William A. Mueller, Glendale, Calif.; George C. Hsu, La Crescenta, Calif., and Harold E. Marsh, Jr., La Canada, Calif.

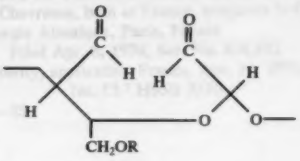
Filed Mar. 15, 1976, Ser. No. 666,992

Int. Cl.[2] C08B *3/22, 11/20, 15/02, 31/18*

U.S. Cl. 536—56 **7 Claims**

1. A modified polysaccharide containing 10% to 35% by

weight of $C_2 - C_3$ aldehyde groups and in which 0.05 to 0.5 of the amylose units are of the formula:



where R is the residue of an ether or ester moiety.

4,041,234

DISPERSIBLE GLYOXAL-XANTHAN GUM COMPLEXES

Fred J. Maske, St. Paul, Minn., assignor to General Mills Chemicals, Inc., Minneapolis, Minn.

Filed Aug. 23, 1976, Ser. No. 716,630
Int. Cl.[2] C08B *37/00*
U.S. Cl. 536—114 **1 Claim**

1. A hand stirring-dispersible xanthomonas gum-glyoxal complex comprising the reaction product of xanthomonas gum and from about 0.02% to 5% by weight glyoxal based upon the weight of dry xanthomonas gum.

4,041,235

SYNTHETIC RESIN COMPOSITION

Akira Suzuki, Shibukawa; Ituo Orihara, Maebashi, and Akira Ishida, Fujimi, all of Japan, assignors to Kanto Denka Kogyo Co., Ltd., Tokyo, Japan

Filed May 19, 1975, Ser. No. 578,508
Claims priority, application Japan, May 29, 1974, 49-59790
Int. Cl.[2] B32B *27/38, 27/30*
U.S. Cl. 428—413 **11 Claims**

1. A molding composition which is normally solid, said composition comprising a thermoplastic resin having a polymerization degree of from 1000 to 1500 prepared by suspension copolymerizing in liquid phase of monomers consisting essentially of from about 0.5% to about 10% by weight of glycidyl methacrylate monomer as an internal heat stabilizer, from about 70% to about 95% by weight of vinylidene chloride monomer and the balance vinyl chloride monomer.

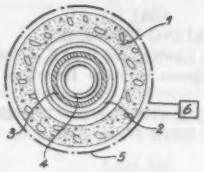
ELECTRICAL

4,041,236

FURNACE HAVING CERAMIC HEATING ELEMENTS

Pierre Dumont, La Celle Saint Cloud, and Alain Moise, Saint Remy les Chevreuse, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Apr. 8, 1976, Ser. No. 674,952
Claims priority, application France, Apr. 11, 1975, 75.11335
Int. Cl.[2] H05B 3/10
U.S. Cl. 13—25 10 Claims



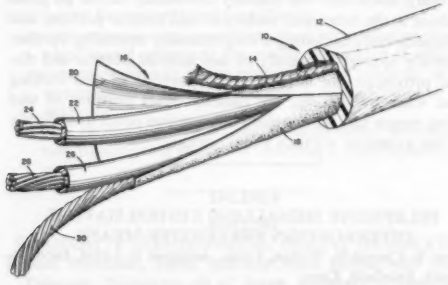
1. A furnace having ceramic heating elements and essentially provided within the central furnace cavity from the periphery to the center with a first thermal insulation, at least one element of lanthanide chromite, a second thermal insulation and at least one element of ceramic material which is capable of operating at approximately 2000° C.

4,041,237

ELECTRIC CONDUCTOR ADAPTED FOR USE IN PROCESS INSTRUMENTATION

Clifford R. Stine, Solon; Bruce E. Klipec, Aurora, and William J. Herbert, Mantua, all of Ohio, assignors to Samuel Moore & Company, Aurora, Ohio

Continuation of Ser. No. 498,716, Aug. 19, 1974, abandoned. This application Feb. 9, 1976, Ser. No. 656,722
Int. Cl.[2] H01B 3/30, 7/18
U.S. Cl. 174—36 13 Claims



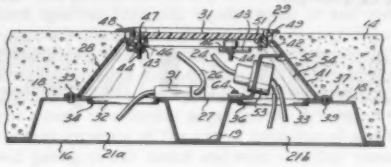
1. An electrical cable having improved dimensional stability and other properties which adapt it for use at elevated temperatures comprising at least two electrical conductors each having (1) an electrical insulating coating, said coating being an irradiation cured member selected from the group consisting of ethylene-tetrafluoroethylene copolymer, ethylene-chlorotrifluoroethylene copolymer and polyvinyl chloride, and (2) a protective jacket selected from the group consisting of irradiation cured halosulfonated polyethylene polymer, a polychloroprene and chlorinated polyethylene about the insulated conductors.

4,041,238

PRESET HOUSING FOR ELECTRICAL DISTRIBUTION SYSTEMS

John P. Penczak, Euclid, Ohio, assignor to Bargar Metal Fabricating Company, Cleveland, Ohio

Filed Dec. 5, 1975, Ser. No. 638,176
Int. Cl.[2] H02G 3/12
U.S. Cl. 174—48 19 Claims



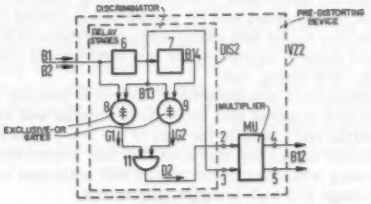
1. A preset access housing for under floor electrical distribution systems having raceway cells extending below the surface of a concrete or the like floor comprising a base wall adapted to fit against a cell and provide access thereto, a generally conical sidewall joined with said base wall at one end having a first diameter and continuously converging to an open second end having a second diameter substantially smaller than said first diameter, said sidewall being proportioned to locate said open end adjacent to but below the surface of a floor, and closure means closing said open end, said conical sidewall providing a substantially continuous curve for stiffness to support the concrete or the like forming a floor and providing a gradual transition from said first diameter to said second diameter without resulting in a thin layer of concrete or the like in the floor around said open end.

4,041,239

METHOD AND APPARATUS FOR THE TRANSMISSION OF DATA

Adolf Haass, Munich, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Sept. 4, 1974, Ser. No. 503,167
Claims priority, application Germany, Sept. 24, 1973, 2347898
Int. Cl.[2] H04L 3/00
U.S. Cl. 178—68 5 Claims



1. Apparatus for transmitting data so as to reduce the effects of signal distortions caused by a transmission medium, comprising:

a source of data signals,

encoding means for forming from said data signals a combination of wide rectangular pulses and narrow rectangular pulses having a pulse width equal to half the width of said wide rectangular pulses,

discriminator means for producing a discriminator signal upon the appearance of a said wide rectangular pulse,

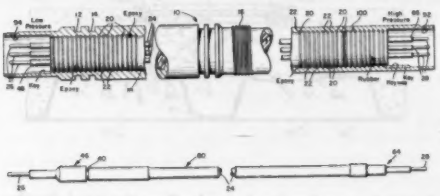
multiplier means for producing a pre-distorted signal by multiplying said encoded data signal with said discriminator signal and

means for transmitting said pre-distorted signal and said narrow rectangular pulses over the transmission medium.

4,041,240
ELECTRICAL FEED-THROUGH ASSEMBLY AND METHOD OF MAKING SAME

Alexander D. Sipowicz, 4218 W. 168th St., Lawndale, Calif. 90260

Filed Dec. 8, 1975, Ser. No. 638,524
Int. Cl.[2] H01B *17/30*
U.S. Cl. 174—151 13 Claims



1. An electrical feed-through assembly comprising:
a hollow tubular casing having means on the periphery for restraining and sealing said casing in a high differential pressure environment,
a plurality of separate electrical conductors electrically insulated from each other and mechanically supported within the length of said hollow casing,
separate rigid dielectric materials bonded to the end portions of each conductor for providing electrical insulation and mechanical rigidity against the differential pressure for each conductor, and
a separate flexible tube of dielectric material completely covering each conductor and bonded and sealed to said rigid dielectric materials at each end of each conductor and to each conductor therebetween.

7. An electrical feed-through assembly comprising:
a hollow tubular casing having means on the periphery for restraining and sealing said casing between a high and low pressure environment,
a plurality of separate electrical conductors electrically insulated and supported within the length of said hollow casing,
dielectric materials completely covering and bonded to each conductor,
a separate deformable dielectric bonding material adjacent the high pressure end for sealing and insulating said conductors within said casing whereby pressure will deform said material to improve the seal between said conductors and said casing, and
a substantially non-deformable dielectric bonding material located adjacent said deformable material and extending within said casing to the area of the low pressure end for fixedly supporting and insulating said conductors in said casing whereby the conductors will withstand both high voltage and high pressure differentials.

9. The method of constructing a feed-through assembly having a plurality of conductors located within a casing and capable of withstanding high voltage and high pressure differentials comprising the steps of:
first epoxy a fiberglass dielectric insert to each end of the conductors,
then cover portions of each insert with a tube of polyolefin dielectric that is shrunk in place over the conductor and the inserts,
locate a filling hole in the side of the casing close to the high pressure end,
then locate and hold the individual conductors within the casing,
then holding the casing in a vertical position with the high pressure end down charge the casing with a first small amount of epoxy and heat cure,
then charge the casing with a second amount of epoxy larger than the first and heat cure,
then charge the casing with a third amount of epoxy to a point below the filling hole and heat cure,
then place the casing on its side with the filling hole vertical and heat,
then insert neoprene heated within the filling hole until the casing is full,
then heat the casing again until the neoprene is vulcanized, and
then insert a plug into the filling hole and seal.

4,041,241
SEALING GROMMET

Clarence W. Olmstead, Lawton, and Fred E. Triquet, Paw Paw, both of Mich., assignors to Arco Industries Corporation, Schoolcraft, Mich.

Filed Aug. 2, 1976, Ser. No. 710,825
Int. Cl.[2] H01B *17/30*; F16L *5/02*
U.S. Cl. 174—153 G 8 Claims

1. A snap in grommet of the type for mounting in a panel opening wherein an elastomeric body is formed with an opening adapted to sealingly support a member therein, said body opening including a longitudinal axis, and a nonelastomeric element having a base portion imbedded in said elastomeric body, said element including locking means extending longitudinally from said base portion, said locking means having radially outwardly offset portions, wherein the improvement comprises: said elastomeric body having an annular portion spaced radially outwardly of the body opening, said annular body portion including inner and outer wall surfaces, the locking means of said non-elastomeric element being imbedded in said body such that the radially outwardly offset portions terminate at the outer wall surface of said annular portion, said elastomeric body including a longitudinally extending lip concentrically spaced outwardly of said annular portion and disposed proximate the radially offset portions of said locking means whereby said lip, the radially offset portions of said locking means and the annular body portion coact to sealingly lock the grommet within a panel opening.

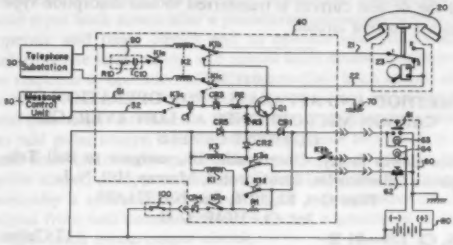
4,041,242
TELEPHONE SIGNALLING SYSTEM HAVING INTERRUPTION PREVENTIVE MEANS

Steven T. Churchill, Wilton, Conn., assignor to Letot, Incorporated, Fairfield, Conn.

Filed Mar. 8, 1976, Ser. No. 665,107
Int. Cl.[2] H04M *11/04*
U.S. Cl. 179—2 A 4 Claims

1. A telephone signalling system comprising at least one telephone having a manually operated switch which in one position is adapted to connect the telephone for audio communication and in a second position to connect the telephone to a calling signal means, a telephone substation, telephone wires connecting said substation to said telephone, a message control unit adapted to be connected to said telephone wires and control means for selectively disconnecting said telephone wires from said substation and connecting said telephone wires to said message control unit; the improvement comprising having

non-interrupt means separate and independent of said telephone substation responsive to loop current in said telephone



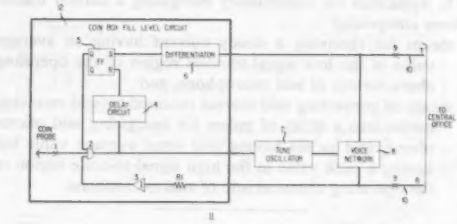
wires when said telephone is connected for audio communication to prevent selective operation of said control means.

4,041,243

COIN BOX SIGNALING ARRANGEMENT

Alfred Zarouni, Middletown, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sept. 20, 1976, Ser. No. 724,651
Int. Cl.[2] H04M *17/02*
U.S. Cl. 179—6.5 **7 Claims**



1. A signaling arrangement for indicating to a remote location that coins in the cash receptacle of a coin-operated device have accumulated to a predetermined fill level, said device being interconnected to said location by transmission means and having an oscillator actuatable to apply a tone signal to said transmission means, said arrangement comprising

a gate circuit responsive to the presence of three enabling inputs for actuating said oscillator;

means responsive to a predetermined accumulation level of coins in said receptacle for enabling one input of said gate;

means responsive to a first predetermined potential on said transmission means for enabling a second input of said gate; and

means responsive to a second predetermined potential on said transmission means for enabling a third input of said gate.

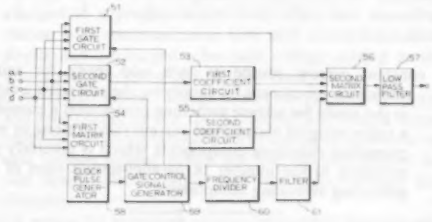
4,041,244

COMPOSITE STEREOPHONIC SIGNAL GENERATOR

Osamu Yamazaki, Suita; Sukeichi Miki, Ikoma, and Tsuneo Takezaki, Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Continuation-in-part of Ser. No. 428,732, Dec. 27, 1973, abandoned. This application Nov. 4, 1975, Ser. No. 628,733
Claims priority, application Japan, Dec. 29, 1972, 48-3611
Int. Cl.[2] H04H *5/00*
U.S. Cl. 179—15 BT **3 Claims**

1. A stereophonic composite signal generator for generating a stereophonic composite signal having one main channel signal, at least one double side-band subsidiary channel signal and at least one pilot signal, the generator comprising gating circuit means for gating plural input signals in rotation in a predetermined sequence and frequency and with a constant duration for each input signal so as to produce a signal corresponding to said stereophonic composite signal and spurious harmonic signals which are (1) outside the frequency band of said stereophonic composite signal, and (2) double side-band signals, the center frequencies of which are integral multiples of the frequency of the rotation of said predetermined sequence, at least one spurious harmonic signal the center frequency of which is three times higher than the frequency of the rotation of said predetermined sequence representing at least one closest spurious harmonic signal closest to said stereophonic composite signal, a single time base source being coupled to said gating circuit means for controlling the gating operation of said gating circuit means and from which said pilot signal is derived, further gating circuit means for gating said input signals in a further sequence, the reverse of said predetermined sequence of the gating operation of said first mentioned gating circuit means and with a further constant duration for each input signal, said time base source being coupled to said further gating circuit means for controlling the gating operation of said further gating circuit means, and the



sum of the duration of the passages of three sequentially gated input signals through said further gating circuit means being synchronized with the duration of the passage of one input signal through said firstmentioned gating circuit means for causing the frequency of the rotation of said further sequence to be three times higher than the frequency of the rotation of said predetermined sequence so as to produce a cancellation signal having a signal component corresponding to said at least one closest spurious harmonic signal and no signal component in the frequency band of said subsidiary channel signals in said stereophonic composite signal; a coefficient circuit means coupled to said further gating circuit means for adjusting the output amplitude of said further gating circuit means; a matrix circuit means coupled to said gating circuit means and to said coefficient circuit means for combining the output signals from said gating circuit means and from said coefficient circuit means so as to cancel said at least one closest spurious harmonic signal in the output signal of said gating circuit means, and at least one filter coupled to said matrix circuit means for attenuating the remaining spurious harmonic signals, if any.

4,041,245

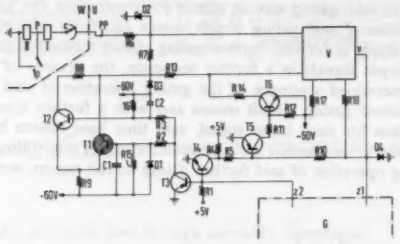
SWITCHING ARRANGEMENT FOR TELECOMMUNICATION SWITCHING SYSTEMS

Justus König, Munich, and Josef Röhrig, Oberhaching, both of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Mar. 22, 1976, Ser. No. 668,954
Claims priority, application Germany, Mar. 21, 1975, 2512633
Int. Cl.[2] H04Q *3/00*
U.S. Cl. 179—18 AB **1 Claim**

1. In a telecommunication switching system having a plurality of switching components, wherein each ready for seizure switching component indicates that readiness by applying an idle potential through a seizing circuit to a test point therein, the busy state being indicated by the absence of said idle potential, and including test switching means in switching components preceding the ready for seizure switching components for determining the busy-idle state of said ready for seizure

switching components, said test switching means having an internal impedance established by connecting said test switching means to a said test point and thereby establishing a test and seizing circuit, and wherein an auxilary test switching means applies a blocking potential differing from said idle potential to a said test point for blocking the said switching component associated with the latter switch point, said auxiliary testing means having an internal impedance equal to that of said test switching means, the improvement comprising:



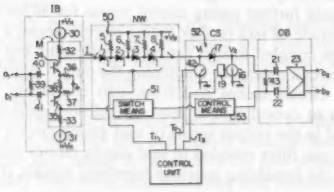
constant current source in each said ready for seizure switching component for supplying the said seizing circuit in the ready for seizure switching component a current of a value bringing about a test current ratio for one or more preceding switching components which is inversely proportional to the number of parallel-testing ones of said preceding switching components.

4,041,246

THYRISTOR CROSS-POINT SWITCH WITH CONTROL

Takuzi Mukaemachi; Toshiaki Toyama, both of Yokohama, and Taturu Miyoshi, Fujisawa, all of Japan, assignors to Hitachi, Ltd., Japan

Filed July 14, 1975, Ser. No. 595,497
Claims priority, application Japan, July 17, 1974, 49-81100
Int. Cl.[2] H04Q *3/52*
U.S. Cl. 179—18 GF **1 Claim**



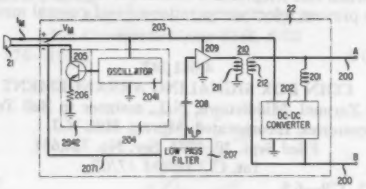
1. A transmission system comprising: a network including cross-point switches formed by four-layer semiconductor switching elements having self-holding function; an input connection circuit disposed at the high potential side of the link of said network to supply said four-layer semiconductor switching elements with dc bias current for holding them conductive and including means to restrict the upper limit of the dc bias current and modulating means for superposing a signal to be transmitted on the dc bias current; a current control circuit disposed at the low potential side of the link of said network and including a current switch circuit and an absorption type constant current circuit, connected in parallel through a diode to said current switch circuit, both circuits being so connected as to permit the dc bias current from the high potential side to the low potential side of said link, an output connection circuit, means for causing said current switch and said absorption type constant current circuit to activate thereby rendering said four-layer semiconductor switching elements conductive when the link of said network is to be closed and means for turning off said current switch so that the dc bias current is transferred to said absorption type constant current circuit.

4,041,247

METHOD AND APPARATUS FOR OPERATION OF CARBON MICROPHONES AT LOW AVERAGE CURRENT LEVELS

Bruce Edwin Briley, Countryside, Ill., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 12, 1976, Ser. No. 731,693
Int. Cl.[2] H04R *3/00*
U.S. Cl. 179—81 R **17 Claims**



1. Apparatus for controllably energizing a carbon microphone comprising

means for receiving a steady current having an average value in the low signal-to-noise region of the operating characteristic of said microphone, and

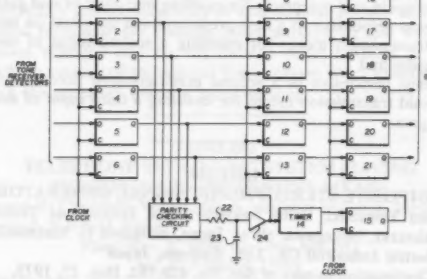
means of converting said current received by said receiving means into a series of pulses for energizing said microphone, said pulses having said same average value but having a peak value in the high signal-to-noise region of the operating characteristic of said microphone.

4,041,248

TONE DETECTION SYNCHRONIZER

Robert Herbert Beeman, Berkeley, and Lloyd Arthur Tarr, Elmhurst, both of Ill., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Oct. 21, 1976, Ser. No. 734,494
Int. Cl.[2] H04M *1/50*
U.S. Cl. 179—84 VF **6 Claims**



1. A tone synchronizer circuit connected to at least one tone detector and to a source of regularly recurring clock pulses, said tone synchronizer circuit comprising: input latch means connected to said tone detector and including a circuit connection to said pulse source, conditioned in response to a signal from said tone detector and operated in response to a pulse from said pulse source; output latch means including an output circuit; intermediate latch means connected between said input latch means and said output latch means, conditioned in response to operation of said input latch means; a timer circuit; a

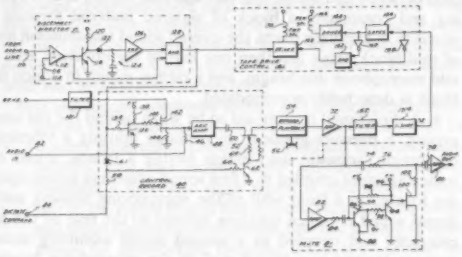
delay circuit connected between said input latch means and said timer and including an output circuit connection to said intermediate latch means, operated in response to operation of said input latch means after a predetermined period of time, to operate said timer circuit and to operate said conditioned intermediate latch means; said output latch means conditioned in response to operation of said intermediate latch means; and a control latch circuit connected between said timer circuit and said output latch means and including a circuit connection to said pulse source, conditioned in response to operation of said timer circuit and operated in response to a pulse from said pulse source, to operate said conditioned output latch means; whereby a synchronized output signal representative of the signal from said connected tone detector is generated at said output latch means output circuit.

4,041,249

CENTRAL DICTATION SYSTEM WITH PRIVACY SIGNAL USED FOR TRANSCRIBING SCANNING

Bjorn J. Matz, Forest Hills, N.Y., and Edward J. Foster, Ridgefield, Conn., assignors to Dictaphone Corporation, Rye, N.Y.

Filed Dec. 27, 1974, Ser. No. 536,754
Int. Cl.[2] G11B *27/30, 27/34, 19/20*
U.S. Cl. 179—100.1 DR 13 Claims



1. In a recording system having a recording station adapted to communicate with a record/reproduce device whereat information is recorded on and reproduced from a recording medium through transducer means, apparatus comprising:

a source for supplying a signal of relatively low oscillating frequency;

detecting means for detecting when communication between said recording station and said record/reproduce device is terminated and for producing an output signal representative thereof, said output signal having a predetermined time duration;

drive means for providing relative movement between said recording medium and said transducer means;

means for applying said output signal of predetermined duration to said drive means to effect forward relative movement between said recording medium and said transducer means for the duration of said output signal;

switch means coupled between said source and said transducer means;

means for applying said output signal to said switch means to actuate said switch means for said predetermined time duration to supply said low frequency signal to said transducer means, whereby said low frequency signal to said transducer means, whereby said low frequency signal is recorded on said recording medium for the duration of said output signal; and

control means coupled to said transducer means and responsive to the reproduction of said low oscillating frequency signal during reverse relative movement between said recording medium and said transducer means to prevent further reverse relative movement thereof and to cause said drive means to effect forward relative movement between said recording medium and said transducer means for a pre-established time duration.

3. In a recording system having a recording station adapted to communicate with a record/reproduce device whereat information is recorded on and reproduced from a recording medium through transducer means, apparatus comprising:

a source for supplying a signal of relatively low oscillating frequency;

detecting means for detecting when communication between said recording station and said record/reproduce device is terminated and for producing an output signal representative thereof, comprising:

voltage sensing means coupled to said recording station for sensing a predetermined change in voltage produced when said recording station terminates communication with said record/reproduce device;

a timing circuit including capacitance means normally charged to a predetermined level when said recording station is in communication with said record/reproduce device and discharged when said voltage sensing means senses said predetermined voltage change;

and AND gate means coupled to said voltage sensing means and said timing circuit for producing said output signal proportional to the coincidence of the signal produced by said voltage sensing means and the signal produced by said timing circuit while said capacitance means discharges;

drive means for providing relative movement between said recording medium and said transducer means;

means for applying said output signal to said drive means to effect forward relative movement between said recording medium and said transducer means for the duration of said output signal;

switch means coupled between said source and said transducer means; and

means for applying said output signal to said switch means to actuate said switch means for said duration of said output signal to supply said low frequency signal to said transducer means, whereby said low frequency signal is recorded on said recording medium for the duration of said output signal.

8. In a transcribinhg device for transcribing information recorded on a recording medium in a format wherein successive messages are separated by a recorded predetermined low frequency signal, apparatus comprising:

drive means for providing relative movement between said recording medium and transducing means, said movement including a normal forward movement for reproducing said information, a fast forward movement for rapidly scanning said recording medium and a reverse movement;

drive control means coupled to said drive means for selectively establishing a mode of operation for said relative movement;

filter means coupled to said tranducing means for detecting the reproduction of said low frequency signal;

means coupled to said filter means for producing an output signal of predetermined duration when said low frequency signal is detected;

indicating means responsive to said output signal for producing an indication of said predetermined duration representing that the end of one message and the beginning of the next succeeding message has been reached; and

means for applying said output signal to said drive means for temporarily halting said relative movement for said predetermined duration and for resuming said relative movement upon the conclusion of said output signal.

4,041,250

COUPLING DEVICE FOR CASSETTE TAPE RECORDER

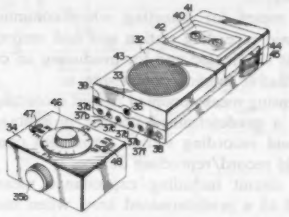
Masanobu Sato, Hachioji, Japan, assignor to Olympus Optical Co., Ltd, Tokyo, Japan

Filed Dec. 10, 1975, Ser. No. 639,271

Claims priority, application Japan, Dec. 23, 1974, 49-155007[U]; Dec. 27, 1974, 50-157061[U]; Dec. 28, 1974, 50-2698[U]

Int. Cl.[2] G11B *31/00*

U.S. Cl. 179—100.11 8 Claims



1. A combination accessory and cassette tape recorder comprising a cassette tape recorder including a coupling surface which is formed with a plurality of socket contacts and a locating recess, a threaded bore formed in the coupling surface, an accessory unit such as a tuner, microphone preamplifier or the like including a coupling surface which is formed with a plurality of pin contacts and a locating pin, the pin contacts being adapted to be brought into electrial connection with the socket contacts of the recorder and the locating pin being adapted to be engaged with the locating recess in the recorder when the accessory unit is physically coupled with the recorder, and a connection screw rotatably received within the accessory unit and having a free end which projects from the coupling surface thereof for threadable engagement with the threaded bore in the coupling surface of the recorder.

4,041,251

HEARING AID TO BE WORN BEHIND THE EAR OF THE USER AND PROVIDED WITH A PRESSURE-GRADIENT MICROPHONE

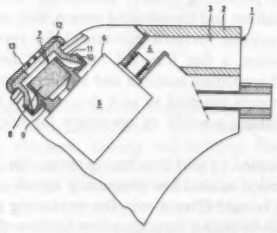
Johannes Matheus Gerardus Maria Kaanders, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 483,614, June 27, 1974, abandoned.

This application Oct. 16, 1975, Ser. No. 622,998

Int. Cl.[2] H04R *1/38, 25/00*

U.S. Cl. 179—107 FD 10 Claims



1. A directional hearing aid to be worn behind the ear comprising, a pressure-gradient microphone containing a vibratory diaphragm and having a first sound admitting opening in a front wall of the microphone case and a second sound admitting opening in a lateral wall thereof and which communicates with the rear surface of the diaphragm whereby sound is transmitted to both sides of the diaphragm, a crescent shaped housing inside of which the microphone is mounted, said housing including acoustic duct means having a frontal sound entrance aperture coupled to said microphone first sound admitting opening and a dorsal sound entrance aperture located rearwardly of the frontal sound entrance aperture and coupled to said microphone second sound admitting opening, an acoustic impedance positioned outside of the microphone case between the dorsal aperture and said second sound admitting opening and comprising a body of sintered material forming capillary ducts through which the sound must pass to reach said second sound admitting opening, the overall sound transmission area of said body being less than one half of the effective area of the microphone diaphragm, and a resilient mount having an opening on one face thereof and a recess in which said sintered body is mounted so as to be readily removable from the mount via said opening therein, said mount being located external of the microphone case and within said housing so that the sintered body is positioned normal to at least one of said microphone sound admitting openings.

2. A directional hearing aid to be worn behind the ear comprising, a pressure-gradient microphone housing a vibratory diaphragm, acoustic duct means having a frontal sound entrance aperture coupled to a first sound admitting access opening of the microphone and a dorsal sound entrance aperture located to the rear of the microphone and coupled to a second sound admitting access opening of the microphone that communicates with the rear surface of the diaphragm, said frontal sound aperture being located substantially at right angles to the dorsal sound entrance aperture, an acoustic impedance coupled between said dorsal aperture and said second access opening and comprising a block of sintered material forming a plurality of capillary ducts, the overall sound transmission area of said block being less than one half of the effective area of said microphone diaphragm, and a rubber mount in which the block is detachably accomodated.

4. A directional hearing aid to be worn behind the ear comprising, a pressure-gradient microphone housing a vibratory diaphragm, acoustic duct means having a frontal sound entrance aperture coupled to a first sound admitting access opening located in a front wall of the microphone housing and a dorsal sound entrance aperture located to the rear of the microphone and coupled to a second sound admitting access opening located in a lateral wall of the microphone housing that communicates with the rear surface of the diaphragm, said frontal sound aperture being located substantially at right angles to the dorsal sound entrance aperture, and an acoustic impedance coupled between said dorsal aperture and said second access opening and comprising a block of sintered material forming a plurality of capillary ducts, said block of sintered material being mounted external to the microphone housing and within the acoustic duct means and having diameter to height dimensions in the ratio of approximately 3:2 and with the overall sound transmission area of said block being less than one half of the effective area of said microphone diaphragm.

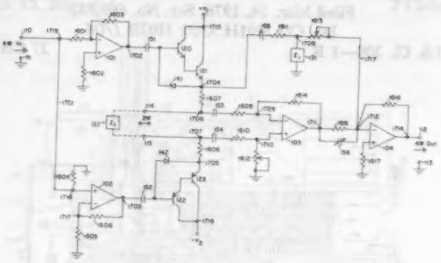
6. A miniature directional hearing aid to be worn behind the ear comprising, a pressure-gradient microphone containing a vibratory diaphragm and having a first sound admitting opening in a front wall of the microphone case and a second sound admitting opening in a lateral wall thereof and which communicates with the rear surface of the diaphragm whereby sound is transmitted to both sides of the diaphragm, a crescent shaped housing inside of which the microphone is mounted, said housing including acoustic duct means having a frontal sound entrance aperture coupled to said microphone first sound admitting opening and a dorsal sound entrance aperture located rearwardly of the frontal sound entrance aperture and coupled to said microphone second sound admitting opening, and an acoustic impedance positioned outside of the microphone case between the dorsal aperture and said second sound admitting opening and comprising a body of sintered material forming capillary ducts through which the sound must pass to reach said second sound admitting opening, the overall sound transmission area of said body being less than one half of the effective area of the microphone diaphragm.

4,041,252

TRANSFORMERLESS TWO-WIRE/FOUR-WIRE HYBRID WITH DC SOURCING CAPABILITY

Earl Thomas Cowden, Galion, Ohio, assignor to North Electric Company, Galion, Ohio

Filed June 7, 1976, Ser. No. 694,027
Int. Cl.[2] H04B 1/58
U.S. Cl. 179—170 NC 6 Claims



1. A transformerless hybrid arrangement for coupling a two-wire communication path having first and second terminals to a four-wire communication path having an input terminal pair and an output terminal pair and for simultaneously providing said two-wire communication path with DC battery feed, said arrangement comprising;

first and second combined battery and voice signal injection means for furnishing AC voice signals in series with DC battery potential at respective combined injection means outputs, first and second input amplifiers respectively coupling a four-wire input signal at said input terminal pair to the inputs of said first and second combined battery and voice signal injection means, first and second coupling means for respectively coupling the outputs of said first and second injection means to said first and second terminals of said two-wire communication path,

a differential amplifier having inputs respectively coupled to said first and second terminals of said two-wire communication path, a buffer amplifier having one input coupled to the output of said differential amplifier and an output coupled to said output terminal pair of said four-wire communication path, and

transhybrid balance means having an input arranged for receipt of a signal proportional to said four-wire input signal and having an output coupled to said one input of said buffer amplifier.

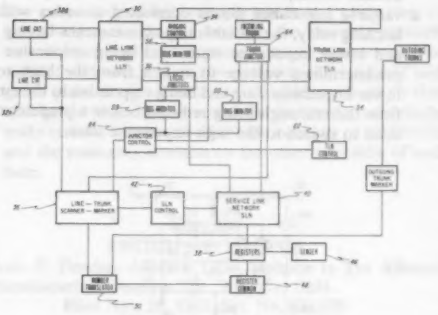
4,041,253

BUS MONITOR CIRCUIT FOR DETECTING MALFUNCTION OF TELEPHONE CIRCUITS CONNECTED IN GROUPS TO A COMMON BUS

Otto Altenburger, Rochester, and Alton E. Dorazio, Rochester, both of N.Y., assignors to Stromberg-Carlson Corporation, Rochester, N.Y.

Filed Oct. 23, 1975, Ser. No. 625,003
Int. Cl.[2] H04M 3/22
U.S. Cl. 179—175.2 R 12 Claims

1. In a telephone system including a plurality of first circuits each having a plurality of terminals selectively connectable to one end of a multi-conductor bus which is connected at the other end thereof to terminals of a second circuit having timing means for timing the operation thereof, a bus monitor circuit comprising detection means for detecting a predetermined electrical potential, connection means responsive to said timing means for connecting said detection means to each of said terminals of at least some of said first circuits when said second circuit fails to complete its operation in a predetermined time, and control means responsive to said detection means detecting said predetermined electrical potential for disabling the first circuits connected to said detection means.

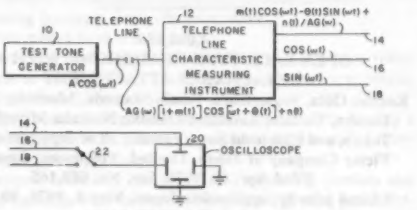


4,041,254

TELEPHONE LINE CHARACTERISTIC DISPLAY

Frank R. Bradley, Bronx, and Rawley D. McCoy, Bronxville, both of N.Y., assignors to Bradley Telcom Corporation, Leonia, N.J.

Filed Aug. 24, 1976, Ser. No. 717,350
Int. Cl.[2] H04B 3/46
U.S. Cl. 179—175.3 R 8 Claims



1. A transmission path characteristic display system comprising means for processing a received signal having test tone and disturbance components therein to derive a first signal substantially representative of the instantaneous disturbance component and in which the test tone component is substantially eliminated, display means having first and second orthogonal inputs responsive to the application of signals thereto for generating a display, means for coupling said first signal to said first input, and means for applying to said second input a periodic signal which is synchronous with the received test tone component.

4,041,255

SWITCHING CIRCUIT FOR TELECOMMUNICATIONS LINES

Ronan Malcolm Cambridge, and Douglas John Watson, both of Ottawa, Canada, assignors to Northern Telecom Limited, Montreal, Canada

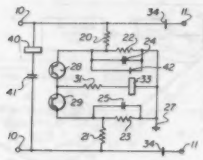
Filed Sept. 29, 1976, Ser. No. 727,709
Int. Cl.[2] H04B 3/46
U.S. Cl. 179—175.3 R 10 Claims

1. A switching circuit for connecting and disconnecting subscriber equipment associated with a subscriber loop, in response to a voltage control signal momentarily transmitted on the subscriber loop, the switching circuit comprising:

switch means including a magnetically latching relay and associated contact means, the contact means for connection in series between the subscriber loop and subscriber

equipment, whereby operation of the latching relay effects a connected state or a disconnected state between the subscriber equipment and the subscriber loop via the contact means;

a variable impedance means connected in series with the latching relay, the variable impedance means having high and lower impedance states and being responsive to a predetermined voltage to switch from the high to the lower impedance state and being responsive to the current flow therethrough being reduced below a predetermined level to switch to the high impedance state;



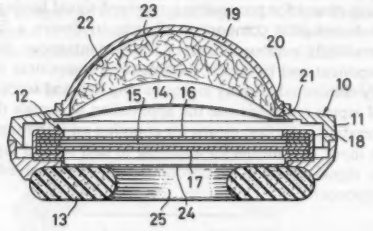
switch control means connected to the switch means, the switch control means including charge storage means for connection via a predetermined impedance means to a lead in the subscriber loop, whereby the voltage control signal causes an accumulation of charge to occur in the charge storage means at a potential of up to said predetermined voltage whereafter the accumulated charge is rapidly dissipated through the variable impedance means and the latching relay causes the associated contacts to effect one of the two states.

4,041,256

OPEN-BACK TYPE HEADPHONE WITH A DETACHABLE ATTACHMENT

Kazuho Ohta, Sagamihara; Fumio Matsuda, Machida; Tsutomu Tanaka, Yamato; Katsuhiro Ohnuki; Naotaka Miyaji, both of Tokyo, and Hidetoshi Sato, Yamato, all of Japan, assignors to Victor Company of Japan, Limited, Yokohama, Japan

Filed Apr. 30, 1976, Ser. No. 682,165
Claims priority, application Japan, May 6, 1975, 50-53147
Int. Cl.[2] H04R *1/10*
U.S. Cl. 179—182 R **7 Claims**



1. An open-back type headphone comprising:

a driver unit for operating as a sound generating source;

a case accommodating therewithin said driver unit and having a front face on the side to confront and be pressed against an ear of a listener and a back face on the side opposite that of the front face, said back face being acoustically open;

an ear pad provided on said front face of the case and forming at the center thereof a front air chamber; and

an attachment detachably attached to said back face of the case,

said attachment having an open end communicable with the back face of the case and an internal space of a specific volume and being adapted to cover and seal the back face of the case,

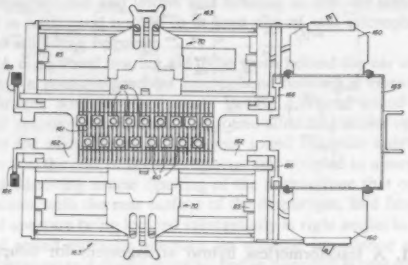
said attachment and said case having cooperatively an attaching mechanism by which the attachment can be detachably attached to the case.

4,041,257

CROSS CONNECT PANEL FOR LIGHTING SYSTEMS

LeRoy D. Yancey, 1834 S. Oakmont Drive, Bountiful, Utah 84010

Filed Mar. 24, 1976, Ser. No. 669,882
Int. Cl.[2] H01H *9/00*; H02B *1/04*
U.S. Cl. 200—1 R **27 Claims**



1. A cross-connect panel, comprising:

a base supply section having

a pair of approximately parallel, side support members, each including a bottom element, an inner side wall upstanding from said bottom element, an elevated support element extending approximately normal from said inner side wall away from the other said side support member and an outer side wall upstanding from said elevated support element, said side support elements being spaced to form a channel between their respective inner side walls;

a plurality of bus bars arranged in approximately parallel spaced relationship within and in approximately longitudinal alignment with said channel;

a plurality of insulating strips interleaved with said bus bars to electrically isolate said bus bars from each other and said side support members;

means for restraining said bus bars from movement longitudinally in said channel;

means for restraining said bus bars from movement either up or down from said channel; and

means for electrically connecting said bus bars individually to power supply means; and

a cross-connect load section comprising a plurality of load-connector modules mounted in approximately parallel relationship transverse the bus bars on said elevated support elements each of said load-connector modules including:

a support member including at least one flat surface upstanding from and transverse said bus bars, said surface carrying a thin conductive strip electrically isolated from said bus bars, and including means for connecting said conductive strip to an external load circuit; and

a brush assembly mounted to slide along said support member parallel said surface, and including:

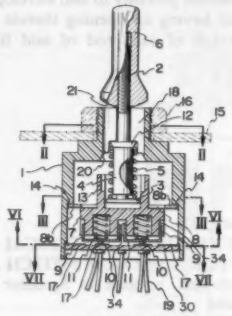
a brush contact mounted in slideable engagement with said conductive strip, and

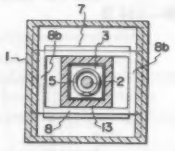
a main bus bar contact operable for selective engagement with a selected of said plurality of bus bars in circuit with said brush contact to selectively make or break an electrical circuit between said bus bar and said conductive strip.

4,041,258
SWITCH HAVING UNIVERSAL TYPE ACTUATOR AND GUIDE PLATE

Shinichi Harada, Tokyo, Japan, assignor to Niles Parts Company, Limited, Tokyo, Japan

Continuation-in-part of Ser. No. 565,001, April 4, 1975, abandoned. This application June 2, 1976, Ser. No. 692,123
Claims priority, application Japan, Apr. 27, 1974, 49-47588
Int. Cl.[2] H01H *25/04, 15/00*
U.S. Cl. 200—6 A **2 Claims**





1. A lever switch comprising:

a housing having a vertical hole with a cruciform cross-sectional shape formed in its upper portion, said hole having an outwardly tapered recess;

a substantially square base secured to said housing, said base having a pair of stationary contacts formed along each side thereof;

a block having an integrally formed hollow cube formed on top of the block, said cube having a smaller cross-sectional area than said block whereby a pair of spaced and parallel abutment surfaces are formed on the top of the block along two opposite sides thereof;

said block being positioned within the housing and having movable contacts at its base adapted for selected engagement with the stationary contacts on the base of the housing; a rectangular guide plate having two short sides and two long sides and a rectangular oblong aperture formed therethrough, said hollow cube being positioned through said oblong aperture in said guide plate so that the bottom of the long sides of the guide plate abut against the abutment surfaces on said block whereby said guide plate permits said hollow cube to move longitudinally along said oblong aperture but prevents lateral movement of the cube;

the short sides of the guide plate being slidably received along shoulder abutments formed in said housing;

a shift lever protruding upward from said housing after passing through a flanged sleeve and the vertical hole and provided at its inner end with a square plate inserted loosely in said hollow cube and having a knob attached to its outer end; and

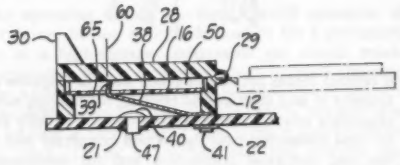
a coil spring arranged between the flange of said sleeve and the square plate so as to push said flange against the bottom of the vertical hole and pull the knob attached to the outer end of said shift lever onto the top of said vertical hole;

whereby said shift lever is operable to both move said hollow cube along said oblong aperture in said guide plate to selectively make contact between the movable contacts on said block and the stationary contacts on two opposite sides of said base, and also to move the short sides of said guide plate along said housing shoulder surfaces so that said guide plate moves said cube to thereby selectively make contact between the movable contacts on said block and the stationary contacts on the other two sides of said base.

4,041,259
SWITCH MECHANISM

Andrew F. Deming, Alliance, Ohio, assignor to The Alliance Manufacturing Company, Inc., Alliance, Ohio

Filed Nov. 28, 1975, Ser. No. 636,079
Int. Cl.[2] G06K *7/06*
U.S. Cl. 200—46 **37 Claims**



1. A switch mechanism comprising, in combination,

a housing having a first reference plane,

support means in said housing,

a removable card supported on said support means transverse to said reference plane and having abutment means,

first and second contact means,

said first contact means including a contact blade having a mounting portion, a movable contact portion and a movable actuable portion,

first means relatively mounting said mounting portion and said housing with said actuable portion in said first reference plane and transverse to said card,

second means relatively mounting said second contact means and said housing in a position for engagement of said second contact means by said contact blade contact portion,

and selective means to actuate said first and second contact means selectively into one of contact closed and contact open circuit conditions including said card and including first locator means establishing disposition of said card in said support means with said abutment means on said card in said first reference plane to engage said contact blade actuable portion to establish said first and second contact means in a contact closed circuit condition.

4,041,260
INTERLOCK FOR CIRCUIT BREAKERS

David L. Swindler, Franklin, and Donald L. Dykes, Middletown, both of Ohio, assignors to Square D Company, Park Ridge, Ill.

Filed Oct. 10, 1975, Ser. No. 622,284
Int. Cl.[2] H01H *9/20, 3/20*
U.S. Cl. 200—50 A **7 Claims**

1. An interlocking means for enabling the closure of a circuit breaker of the type controlled by an external control system comprising:

a first connector, a shaft, means rotatably supporting said shaft on said first connector,

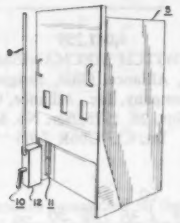
a second connector for engagement with said first connector and having an opening to receive the shaft for rotation in said opening when said first connector is moved relatively towards said second connector, said first and second con-

nectors including means for establishing an electrical connection between said circuit breaker and said control system in response to the full engagement of said first connector with said second connector;

a latching means;

operating means effective for normally moving said latching means for enabling the closure of the circuit breaker;

disabling means normally effective for preventing movement of said latching means by said operating means in response to the disengagement of said shaft from said opening;



and control means operated by said shaft in response to the rotation of said shaft in said opening for moving said first connector relative said second connector to fully engage the first connector with the second connector and establish said electrical connection and for simultaneously rendering said disabling means ineffective to prevent movement of the latching means and thereby enable said operating means to independently move said latching means and enable closure of said circuit breaker.

4,041,261

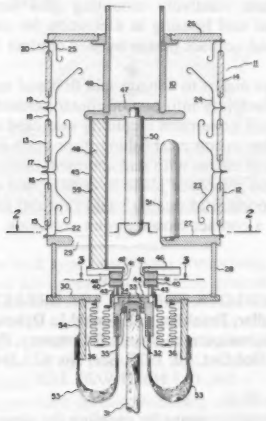
HIGH CURRENT CAPACITY ROD ARRAY VACUUM ARC DISCHARGE DEVICE

Joseph A. Rich, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed June 24, 1975, Ser. No. 589,892

Int. Cl.[2] H01H *33/66*

U.S. Cl. 200—144 B **20 Claims**



1. A vacuum arc discharge device comprising:

a hermetically sealed, evacuated envelope;

a plurality of contact pairs arranged in a predetermined pattern within said envelope, each of said contact pairs including a movable contact and a fixed contact, each of the movable contacts being electrically interconnected and mechanically coupled to a common, movable support having a major portion of its volume situated outside said envelope;

a first plurality of electrically conducting rods contained in said envelope, each rod of said first plurality being mechanically and electrically coupled to a respective one of the fixed contacts and to a common metallic support plate;

a second plurality of electrically conducting rods contained in said envelope and interdigitally spaced in alternating fashion with respect to said first plurality of rods; and

a second metallic plate mechanically and electrically connecting each rod of said second plurality to said envelope, said second metallic plate having an opening therein to permit passage therethrough of each rod of said first plurality.

4,041,262

CONTACT ARRANGEMENT FOR AN ELECTRICAL SWITCH, ESPECIALLY FOR A VACUUM SWITCH

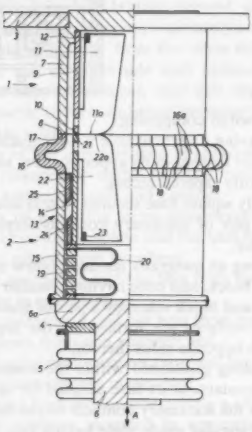
Joachim Amsler, Seon, Switzerland, assignor to Sprecher & Schuh AG, Aarau, Switzerland

Filed June 25, 1975, Ser. No. 590,281

Claims priority, application Switzerland, Sept. 2, 1974, 11908/74

Int. Cl.[2] H01H *33/66*

U.S. Cl. 200—144 B **7 Claims**



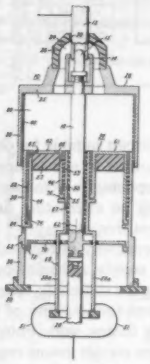
1. A contact arrangement for an electrical switch, especially for a vacuum switch, comprising two contact components movable relative to one another in a first predetermined direction, said contact components having a closed position, one of said contact components defining a movable contact component, the other of said contact components defining a stationary contact component, each of said contact components comprising two contact elements electrically connected in parallel, said contact elements of each of said contact components having an essentially hollow cylindrical configuration and being arranged substantially coaxially with respect to one another to define respective outer and inner contact elements, each of said contact elements having a contact surface, the inner contact and the outer contact elements of said contact components being axially positioned in the direction of movement of said movable contact component, each of said contact elements of said one of said

4,041,263

ELECTRIC CIRCUIT INTERRUPTER OF THE PUFFER TYPE COMPRISING A MAGNETICALLY ACTUATED PISTON

Heinz O. Noeske, Cherry Hill, N.J., assignor to General Electric Company, Philadelphia, Pa.

Filed Aug. 22, 1975, Ser. No. 607,084
Int. Cl.[2] H01H *33/20*
U.S. Cl. 200—148 A 13 Claims



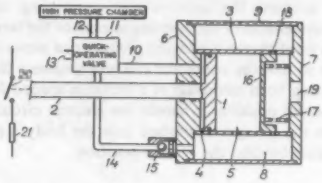
1. In a puffer-type electric circuit interrupter:
a. a pair of separable contacts,
b. a movable conductive rod electrically connected to and mechanically coupled to one of said contacts,
c. means for transmitting contact-separating force to said conductive rod,
d. a cylinder having an end wall coupled to said conductive rod,
e. a piston located within said cylinder and relatively movable with respect to said cylinder for pressurizing fluid within said cylinder when said piston is moved relative to said end wall in a direction toward said end wall,
f. means for conveying pressurized fluid from said cylinder to the space between said contacts upon contact-separation to aid in extinguishing arcs formed between said contacts,
g. first tubular conductive structure surrounding said conductive rod,
h. second tubular conductive structure surrounding said first tubular conductive structure and said conductive rod,
i. said piston having a portion forming an electrical connection between said first and second tubular conductive structures and being movable with respect to said first and second tubular conductive structures,
j. conductive bridging structure extending between and electrically interconnecting said conductive rod and said second tubular conductive structure,
k. means effective during a contact-separating operation for forcing current flowing through said conductive rod to follow a loop-shaped path that extends in series through said rod, said bridging structure, said second tubular conductive structure, said piston portion, and said first tubular conductive structure, with the instantaneous current in said path flowing through said first tubular structure and said rod in a first direction longitudinally of said rod and flowing through said second tubular structure in a second direction longitudinally of said rod which is generally opposite to said first direction,
l. the magnetic effect of current through said loop-shaped path via said piston portion acting to drive said piston toward said cylinder end wall, thereby pressurizing fluid within said cylinder.

4,041,264

OPERATING DEVICE FOR A CONTACT DEVICE FOR A PRE-INSERTION RESISTOR IN A HIGH-VOLTAGE CIRCUIT BREAKER

Per Olof Grune, Ludvika, Sweden, assignor to Asea Aktiebolag, Vasteras, Sweden

Filed Sept. 8, 1975, Ser. No. 611,323
Claims priority, application Sweden, Sept. 30, 1974, 7412254
Int. Cl.[2] H01H *33/54*
U.S. Cl. 200—148 R 3 Claims



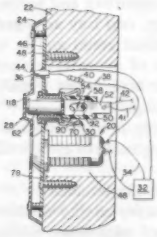
1. An operating device for rapid On-Off operation of a contact device having a movable contact for a pre-insertion resistor in a high-voltage compressed gas circuit breaker, which operating device comprises a high pressure chamber, a cylinder, a piston (1) movable in the cylinder (3) and connected to the movable contact of said contact device, one side of said piston limiting a first cylinder space (4), a quick-operating control valve (11) for connecting said first cylinder space alternatively to said high-pressure chamber for closing the contact device and to a low-pressure space for opening the contact device, the other side of the piston (1) limiting a second cylinder space (5), a delay space, at least one opening which, at least during the latter stage of the contact operation, connects the delay space (8) with the second cylinder space, said control valve including means to connect said delay space (8) to the high-pressure chamber to be supplied with high-pressure gas substantially simultaneously with pressurizing said first cylinder space (4), and a non-return valve in the connection between the delay space (8) and the control valve (11).

4,041,265

ELECTRIC SWITCH

Ronald M. Brave, 3950 McDonogh Road, Randallstown, Md. 21133; Dennis G. Brave, Glencliffe Circle, Brooklandville, Md. 21022, and Arnold S. Feldeman, 10 Melisa Court, Owings Mill, Md. 21208

Filed Feb. 19, 1976, Ser. No. 659,515
Int. Cl.[2] H01H *3/12, 13/64*
U.S. Cl. 200—159 R 7 Claims



1. An electric switch for controlling an electric circuit of the type including a pair of terminals mounted in an insulating body and each having defined therein an opening and an electrically conductive contactor rod mounted on an electrically insulative non-rotatable plunger for movement therewith, the rod extending between the terminals to contact same, the plunger being movably received within the body to move inwardly and outwardly thereof and the contactor rod being

received in the terminal openings for selectively connecting the terminals together when the plunger is in a first position to complete an electric circuit when the contactor rod contacts both terminals, and breaking the electric circuit when the plunger is in a second position when the connector rod is positioned to be out of contact with the terminals, means for mounting the base on a mounting element including a face plate, an insulating member mounted in the base and engaging the terminals for holding the plunger and preventing short-circuiting, and means for biasing the plunger outwardly of the body, the plunger abutting said face plate to hold that plunger in the first position, the improvement comprising: sizing the lengthwise dimension of the opening in each of the terminals to be less than the distance which the plunger can move inwardly of the body so that the contactor rod will assume a third position contacting both terminals at a location spaced from said first and second positions wherein the electric circuit is activated when the plunger is pushed into the body a predetermined distance beyond the second position.

4,041,266

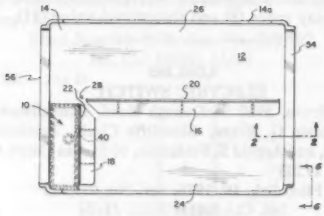
SENSOR AND TRAY ARRANGEMENT

Donald G. Moore, Glencoe, Ill., assignor to Chemetron Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 380,487, July 18, 1973, Pat. No. 3,935,415, and a continuation-in-part of Ser. No. 300,763, Oct. 25, 1972, Pat. No. 3,936,626. This application Oct. 21, 1975, Ser. No. 624,633

Int. Cl.² H05B 9/06

U.S. Cl. 219—10.55 E **21 Claims**



1. A tray, for supporting and serving food items exposed to microwave energy, said tray arranged to carry a plurality of food items in distinct zones and in which zones are applied different amounts of microwave energy, said tray including means to prevent inadvertent transfer of food items during stacking, comprising:

a tray base having an upper surface defining said zones, and said base being made of electrically non conductive material;

flange means at the boundaries of said zones which comprises microwave energy shielding means for restricting the amount of microwave energy within a zone which energy is not intended to be directed into said shielded zone, and said base having a groove formed on said upper surface and receiving a portion of said flange means;

microwave sensing assembly means in a recessed portion of said tray base for sensing the microwave energy incident on said tray; and

supporting means positioned at the periphery of said tray base for maintaining said tray base in a horizontal plane during stacking.

4,041,267

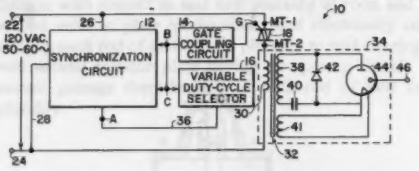
MICROWAVE OVEN POWER CONTROL CIRCUIT

Reuben Wechsler, Phoenix, Ariz., assignor to Motorola, Inc., Schaumburg

Filed Aug. 28, 1975, Ser. No. 608,813

Int. Cl.² H05B 9/06

U.S. Cl. 219—10.55 B **21 Claims**



1. A power control circuit suitable for controlling the power supplied by a power source to a load operatively coupled to the power source, comprising in combination:

means for converting an alternating line power supply to power at a different frequency;

switching means operatively interposed between the alternating line power supply and said converting means; and

means for controlling the switching operation of said switching means to control the intensity of the power provided by said converting means, said controlling means including synchronization circuit means responsive to the alternating line power supply for producing a sync pulse in timed relationship to each successive negative half cycle of the alternating line power suppy for rendering said switching means conductive and nonconductive in a predetermined timed relationship to the alternating line power supply frequency to minimize transients in the power control circuit.

11. A power control circuit suitable for controlling the power supplied by a suource of microwave energy in a microwave oven, comprising in combination:

means for converting an alternating line power supply to microwave power;

switching means operatively interposed between said converting means and the alternating line power supply; and

means for controlling the switching operation of said switching means, said controlling means including synchronization circuit means responsive to the alternating line power supply for producing a sync pulse in timed relationship to each successive negative half cycle of the alternating line power supply for rendering said switching means conductive and nonconductive in a predetermined timed relationship to the alternating line power supply frequency to minimize transients in the power control circuit.

4,041,268

METHOD FOR ADJUSTING THE ECCENTRICITY OF A SPARK-EROSION MACHINING ELECTRODE ENDOWED WITH A MOVEMENT OF CIRCULAR TRANSLATION AND A DEVICE FOR THE APPLICATION OF SAID METHOD

Pierre Braudeau, Paris, and Alfred Marie Aimé Maillet, Versailles, both of France, assignors to Carel Fouche Languepin, Paris, France

Filed Mar. 23, 1976, Ser. No. 669,521

Claims priority, application France, Mar. 25, 1975, 75.09252

Int. Cl.² B23P 1/08

U.S. Cl. 219—69 G **8 Claims**

1. A method for automatically increasing the eccentricity of a circular translation movement of an electrode relative to a workpiece, in a spark erosion machine, said movement having a period of travel, a machining voltage being applied between said electrode and said workpiece, comprising the steps of:

measuring said machining voltage between said electrode and said workpiece;

generating a reference voltage;

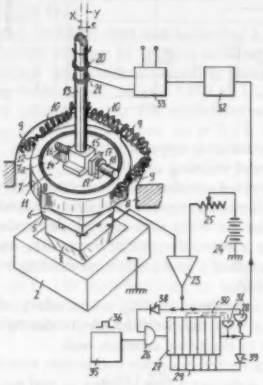
comparing said machining voltage and said reference voltage;

measuring the time interval during which said machining voltage remains continuously higher than said reference voltage;

generating a control signal only said time interval is at least equal to said period of travel; and

controlling the increase of said eccentricity in response to said control signal.

2. A spark-erosion machine comprising an electrode for machining a workpiece, means for applying between said electrode and said workpiece a machining voltage, driving means to drive said electrode and workpiece in a circular translation



movement relative to each other, said circular translation movement having an eccentricity and a period of travel, and means for automatically increasing said eccentricity, said means comprising:

means for measuring the machining voltage between said electrode and said workpiece;

a voltage supply for delivering a reference voltage;

comparision means for comparing said machining voltage and said reference voltage;

means for measuring the time interval during which said machining voltage has remained continuously higher than said reference voltage;

means for generating a control signal only when said time interval is at least equal to said period of travel; and

an electric motor controlled by said control signal to act upon said driving means so as to increase said eccentricity.

4,041,269

CARTRIDGE FOR AN ELECTRICAL DISCHARGE MACHINING APPARATUS

George Edward Baker, Asfordby, near Melton Mowbray, England, assignor to Amchem Company Limited, England

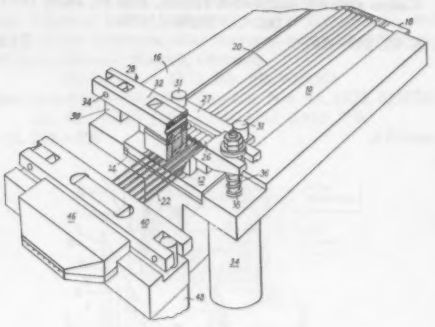
Filed Mar. 15, 1976, Ser. No. 666,916

Claims priority, application United Kingdom, Mar. 15, 1975, 10908/75

Int. Cl.[2] **B23P** *1/08*

U.S. Cl. 219—69 E **11 Claims**

1. A cartridge for an electrical discharge machining apparatus having an electrode nose guide, said cartridge comprising a carriage in the form of a grooved slide having a groove and mounted for sliding movement with respect to said nose guide, an assembly removably received in said groove, a plurality of parallel tubes being mounted on said assembly and insulated one from the other and from the assembly, said tubes being capable of each receiving an electrode as a sliding fit and guiding the electrodes towards said nose guide, said assembly including two supports which are stepped one relative to the other, a first of said supports supporting said electrode tubes and a second of said supports, which second support lies adjacent said nose guide, supporting the electrodes alone, clamp



means mounted upon said carriage and including means operable to lock said electrodes in a fixed position within said cartridge, and means mounted upon said carriage and offering frictional resistance against sliding electrode movement within said tubes.

4,041,270

METHODS OF WELDING CORNER JOINTS

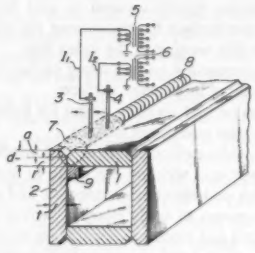
Kozo Akahide, and Kazuo Agusa, both of Chiba, Japan, assignors to Kawasaki Steel Corporation, Kobe, Japan

Filed June 2, 1975, Ser. No. 583,102

Claims priority, application Japan, June 14, 1974, 49-67086

Int. Cl.[2] **B23K** *25/00*

U.S. Cl. 219—73 R **3 Claims**



1. A method of welding corner joints by means of a multiple electrode submerged-arc welding, comprising forming a shallow groove between a steel flange plate and a steel web plate, each having a thickness on the order of at most 5.0 cm, covering said groove with a bed of flux, and feeding at least two electrodes separated from each other along said groove in succession and submerged under said flux, said welding being effected under the following three conditions:

1. The distance between the first and second electrodes is 30 to 80 mm,

2. The current flowing through the second electrode is 60 to 85% of the current flowing through the first electrode, and

3. The welding input heat H is given by

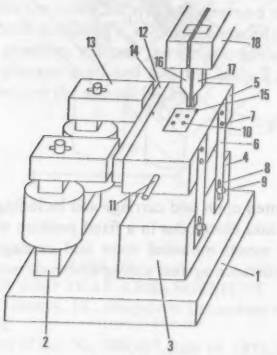
$$H \leqq 24\, d.t \text{ Kjoules/cm}$$

where t is a thickness of said steel flange plate in cm and d is a required penetration depth in cm, whereby a weld bead is completed by a single pass of welding.

4,041,271
MACHINE FOR WELDING SOLAR CELL CONNECTIONS

Dominique Y. Lorans, Paris, France, assignor to Societe Anonyme de Telecommunications, Paris Cedex, France

Filed Jan. 26, 1976, Ser. No. 652,247
Claims priority, application France, Jan. 10, 1975, 75.03126
Int. Cl.[2] B23K *11/10*
U.S. Cl. 219—86 2 Claims



1. A welding machine for welding a connection to a silvered surface of a silicon wafer solar cell comprising:

a base;

a welding mount rigidly secured to said base having an indexed upper surface for positioning the solar cell along a reference line serving as the index line;

an electrical connection on said upper surface for energizing said solar cell at its silvered surface;

holding means on said welding mount for holding said solar cell in place on said upper surface;

at least one welding electrode over said upper surface;

means to lower said welding electrode to make pressuring contact with said electrical connection and said solar cell;

trigger pulse means to apply electric current pulses to said electrode cell and electrical connection means for a preselected time period and at preselected pressures;

the upper surface of said welding mount being in an upper part of said mount which is fastened to the lower part of said mount by a spring means;

an electromagnetic means to impart to the upper part of said welding mount on alternating movement on transverse to said reference line, said alternating transverse movement being of predetermined frequency and predetermined amplitude;

said electromagnetic means comprising an electromagnet fastened to said base, positioned next to said welding mount and including a gap between said electromagnet and said mount;

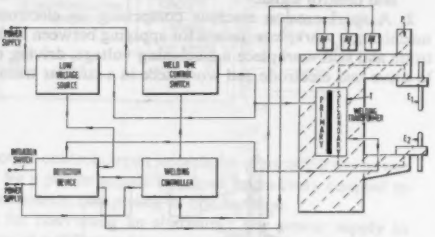
said spring means between the upper and lower parts of said mount below said silicon wafer responding to the vibrations imparted by said electromagnetic means through said gap; and,

adjustable wafer holding means formed as flat springs with oval holes and fastening means attached thereto for holding said silicon wafer solar cell.

4,041,272
RESISTANCE WELDING APPARATUS AFFORDING OPERATOR PROTECTION

Peter Edward Burton, Wallingford; Derek James Pasquire, Witney, and Peter Edward George Marshall, Haddenham, all of England, assignors to British Leyland UK Limited, London, England

Filed Sept. 26, 1975, Ser. No. 617,085
Int. Cl.[2] B23K *11/24*
U.S. Cl. 219—89 5 Claims



1. Resistance welding apparatus comprising:

first and second welding electrodes,

a power-operated welding head operatively connected to said first electrode to move said first electrode from a first position remote from said second electrode to a second position in electrical contact therewith, and adapted to operate in either a low-force non-welding or a high-force welding mode,

a welding transformer having a secondary winding short-circuited across the welding electrodes when said electrodes are in electrical contact, and

electrically actuated operator protection means comprising:

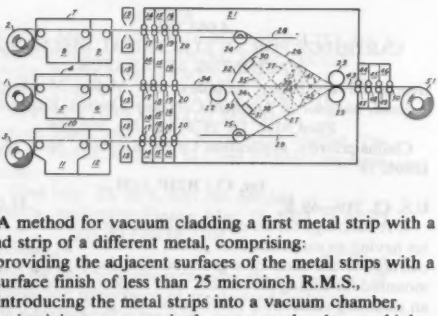
a. means for inducing a low voltage in said secondary winding, and

b. control means responsive to the change in the induced low voltage which results from a short circuit of said secondary winding through the welding electrode and connected to switch the welding head from its non-welding low-force to its high-force welding mode when a short-circuit occurs.

4,041,273
METHOD FOR VACUUM METAL CLADDING

Herbert H. Francisco; Anthony P. Martocci, and Sydney B. Beitel, all of Bethlehem, Pa., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.

Filed Oct. 21, 1975, Ser. No. 624,492
Int. Cl.[2] B23K *9/00*
U.S. Cl. 219—121 EM 10 Claims



1. A method for vacuum cladding a first metal strip with a second strip of a different metal, comprising:

a. providing the adjacent surfaces of the metal strips with a surface finish of less than 25 microinch R.M.S.,

b. introducing the metal strips into a vacuum chamber,

c. maintaining a pressure in the vacuum chamber not higher than 1×10^{-3} Torr,

d. impinging the adjacent surfaces of the strips in the vac-

uum chamber with a stream of electrons having sufficient force to provide strips heated to below the temperature of incipient fusion and with very clean, adjacent surfaces, and

e. placing the very clean, adjacent surfaces of the heated strips into contiguous contact between at least one pair of rolls operating in the vacuum to bond the first metal strip with the second metal strip and produce a strip of clad metal.

4,041,274

MARAGING STAINLESS STEEL WELDING ELECTRODE

Edward Peter Sadowski, Ringwood, N.J., assignor to The International Nickel Company, Inc., New York, N.Y.

Division of Ser. No. 487,780, July 11, 1974, Pat. No. 3,967,036.
This application Mar. 5, 1976, Ser. No. 664,402
Int. Cl.[2] B32B *9/00, 15/18*
U.S. Cl. 219—137 WM **6 Claims**

1. A maraging stainless steel article having a structural configuration adapted for use as an arc welding electrode and having a chemical composition consisting essentially of up to 0.05% carbon, 6.5% to 8% nickel, 9.5% to 11.5% chromium, 0.5% to 0.9% silicon, up to 1% molybdenum, up to 0.1% manganese, up to 0.1% aluminum, up to 0.1% titanium, up to 0.01% sulfur, up to 0.015% phosphorus and the balance iron.

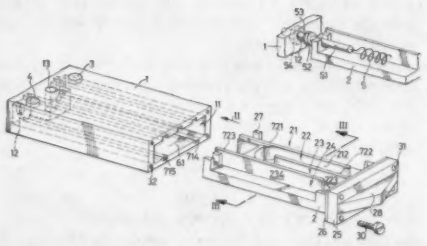
3. In a welding process wherein a welding metal is fused by heat of an electric arc and is deposited on a base metal while shielding the welding metal against atmospheric oxidation, the improvement comprising providing as the welding metal a maraging stainless steel consisting essentially of up to 0.05% carbon, 6.5% to 8% nickel, 9.5% to 11.5% chromium, 0.5% to 0.9% silicon, up to 1% molybdenum, up to 0.1% manganese, up to 0.1% aluminum, up to 0.1% titanium, up to 0.01% sulfur, up to 0.015% phosphorus and the balance iron.

4,041,275

ELECTRICAL HEATING ELEMENT

Claus-Holmer Gerdes, Pirolweg 1, 314 Luneburg, Germany

Filed Apr. 28, 1975, Ser. No. 572,089
Claims priority, application Germany, Mar. 25, 1975, 2513094
Int. Cl.[2] F24H *1/10*
U.S. Cl. 219—307 **10 Claims**



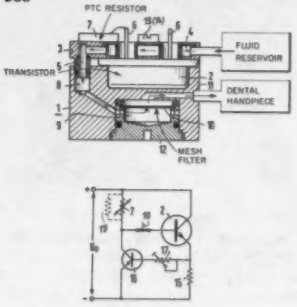
1. An electrical heating element for heating liquid flowing therethrough, comprising: an electrically insulated housing having an inlet, an an outlet, and liquid conducting duct means between said inlet and said outlet for the liquid to be heated; electrical heating coils within said duct means; said housing having an inner part and an outer sleeve part detachably and telescopically receiving with a snug sliding fit said inner part; said inner part having a continuous channel with return bend and adjacent channel portions, with partition walls between adjacent channel portions, and with said channel being open on one side over its entire length; when telescopically assembled, said outer sleeve part closing the open side of said channel to thereby form between said outer sleeve part and said inner part said duct means; sealing means between said inner part and said outer sleeve part for sealing the interior of said housing containing therein said duct means except for said inlet and said outlet; said outer sleeve part and said partition walls having form interlocking sealing means telescopically assembled with a close sliding fit between adjacent channel portions.

4,041,276

ELECTRIC FLUID HEATING DEVICE

Werner Schwarz; Eugen Hohmann, both of Heppenheim, and Bernd Nickel, Bensheim, all of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Nov. 6, 1973, Ser. No. 413,268
Claims priority, application Germany, Nov. 14, 1972, 2255736
Int. Cl.[2] H05B *1/02;* F24H *1/12;* A61F *7/00*
U.S. Cl. 219—308 **3 Claims**



1. An electrical heating device in dental instruments for heating small amounts of a fluid medium, said device comprising a casing consisting of a material with a good thermal conductivity and having an inlet, an outlet and an inner chamber connected with said inlet and said outlet, said chamber being adapted to receive the fluid medium to be heated, a heating element consisting of a controllable semi-conductor, means having a temperature responsive operating member mounted in thermal contact with said casing, said semi-conductor comprising a load output for current flow therethrough when connected to a source of voltage and a control input, and connecting means electrically connecting said control input with said temperature responsive operating member for controlling said current flow, wherein said casing consists of two parts located one on top of the other, the first part of the casing having a recess receiving said semi-conductor, the second part of the casing containing said inner chamber and supporting said operating member determining the temperature of the medium, said semi-conductor having casing surfaces and having upon a casing surface electrical contacting connections extending through the second part of the casing while being insulated therefrom and electrically connected with said semi-conductor, said second part of the casing being thermally connected with said casing surface.

4,041,277

PORTABLE TRAY WARMING UNIT

George Shumrak, Natick, and Anthony Mack, North Reading, both of Mass., assignors to Sweetheart Plastics, Inc., Wilmington, Mass.

Filed June 18, 1976, Ser. No. 697,356
Int. Cl.[2] F27D *11/02*
U.S. Cl. 219—386 **9 Claims**

1. A portable tray warming unit comprising

a casing having at least one tray supporting rack, said casing being of dimensions such that it is convenient for lifting and carrying by a single user,

said casing having an opening for providing access to said rack,

terminal means connected to said casing for receiving energy from an energy source external to said unit,

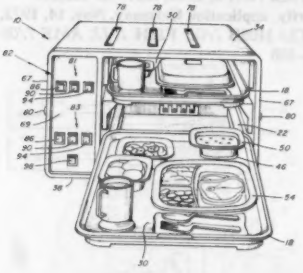
at least one tray constructed and arranged to be removably

supported on the rack and having a supporting surface which receives food receptacles,

said tray having at least one localized heat transfer device in said surface,

said surface of said tray having a substantial portion free of said heat transfer devices,

electrical connecting means for supplying energy from said terminal in the casing to the heat transfer device in the surface of said tray to energize said device when the tray is in place on said rack in the casing,



at least one food receptacle, for removable placement on said surface of said tray, constructed and arranged to be in a heat exchanging relationship with said localized heat transfer device in said tray so as to transmit heat between the device and food contained in said food receptacle,

an upper surface of said casing being capable of supporting the lower surface of an identical tray warming unit and each upper and lower surface carrying complementary means for registration and interlocking with other like tray warming units,

said terminal means including means for electrically connecting said unit to a low voltage outside source.

4,041,278

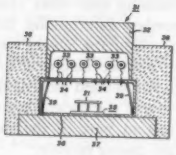
HEATING APPARATUS FOR TEMPERATURE GRADIENT ZONE MELTING

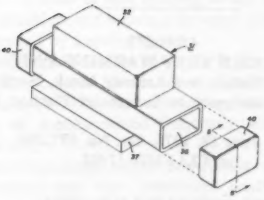
John K. Boah, Auburn, N.Y., assignor to General Electric Company, Auburn, N.Y.

Filed May 19, 1975, Ser. No. 578,736

Int. Cl.[2] H05B *3/02*; F27D *11/02*; H01L *21/324*; F27D *5/00*

U.S. Cl. 219—411 **10 Claims**





1. Apparatus for practicing temperature gradient zone melting comprising:

a tubular quartz glass member defining a work chamber for receiving a body of semiconductor material to be processed, said tubular member having top, bottom and side walls;

an infrared radiation source optically coupled to the interior of said chamber through said top wall of said tubular member for irradiating the body of semiconductor material with radiation which is widely dispersed so as to evenly illuminate a substantial portion of said work chamber, said radiation source comprising a plurality of generally parallel elongated infrared lamps in a planar array;

a semiconductor support means in said chamber and carried by the bottom wall of said tubular member for supporting the semiconductor body with one surface thereof facing and generally parallel to said planar array, said support means making only minimal thermal contact with a surface of the semiconductor body opposite said one surface; and

a metallic cooling block in direct heat conductive engagement with the exterior of the bottom wall of said tubular member.

4,041,279

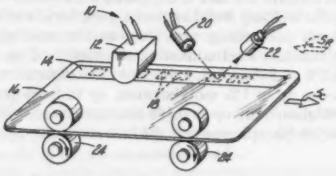
DATA READING DEVICE

Francis C. Foote, Rocky River, Ohio, assignor to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed Aug. 4, 1975, Ser. No. 601,541

Int. Cl.[2] G06K *5/00, 7/08, 7/10*

U.S. Cl. 235—61.7 B **11 Claims**



1. A device for reading documents containing optical data elements and magnetic data elements separate from said optical data elements and with fixed spacial relationships between said optical and magnetic data elements, said device comprising:

magnetic read means for sensing magnetic data elements from a document and providing first signals representative thereof,

optical read means for sensing said optical data elements from the document and providing second signals representative thereof, and

means associated with said magnetic and optical read means for establishing a predetermined reference between said first and second signals whereby the presence or absence of the spacial relationship between the optical and magnetic data elements may be determined.

4,041,280

MONEY COUNTING MACHINE

Kyoichi Ohsako, Kita, and Katusuke Yamashita, Matsudo, both of Japan, assignors to Laurel Bank Machine Co., Ltd., Tokyo, Japan

Filed Feb. 13, 1976, Ser. No. 658,086

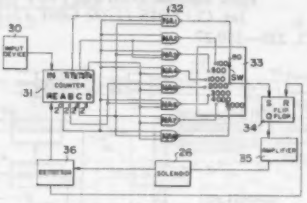
Claims priority, application Japan, Feb. 17, 1975, 50-19592

Int. Cl.[2] G06M *3/02*; G07D *9/00*

U.S. Cl. 235—92 CN **4 Claims**

1. A coin mounting machine comprising detecting means for counting coins and for providing coin count signals corresponding to counted number of coins, a plural-digit counter including a plurality of digit select terminals from which clock pulses are sequentially delivered in regular time intervals and a plurality of bit signal terminals, said counter being connected with the detecting means to receive the coin count signals therefrom and produce bit signals in at least one of said bit signal terminals representative of counted number of coins and corresponding to the digit which is represented by one of the clock pulses of the digit select terminals from which the clock

pulse is being delivered, means connected with said digit selecting terminals and said bit signal terminals to receive signals therefrom for producing an output signal pulse when a predetermined number of coins have been counted, and memory



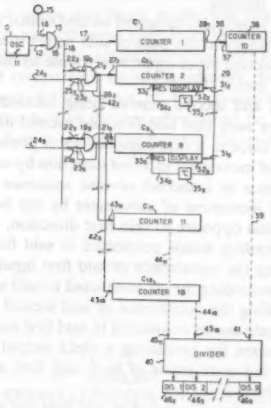
circuit means for memorizing the output signal pulse to produce a stop signal for terminating counting operation of said counting means, said memory circuit means being connected to receive said output signal pulse when a predetermined number of coins have been counted.

4,041,281

APPARATUS FOR THE ANALYSIS OF THE OPERATION OF A SYSTEM USING BINARY SIGNALS

Bruno Gaudeul, Versailles, France, assignor to Iria Institut de Recherche D'Informatique et D'Automatique, Le Chesnay, France

Filed May 18, 1976, Ser. No. 687,605
Claims priority, application France, May 23, 1975, 75.16194
Int. Cl.[2] G07C *3/10*
U.S. Cl. 235—92 PD **5 Claims**



1. An apparatus for the analysis of the operation of components using binary signals, such as computer components, comprising:

an oscillator constituting an adjustable time basis, and provided with an output;

a plurality of probes activated by the operation of said components;

a plurality of counters provided with reset inputs, each counter being associated with a respective one of said probes;

a displaying means connected to each counter;

logical connection means between each counter and, on the one hand, the associated probe and on the other hand the output of the oscillator;

activating means controlling said connection means such that each counter can count either the number of state changes of the oscillator during the activation periods of the associated probe, or the number of the activations of said probe; and

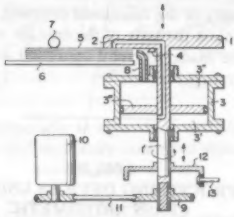
a driving counter having an input and an output, said input being connected to the output of said oscillator and said output being connected to the reset input of each counter, in order for the probe-associated counters to be reset each time the count in the driving counter is completed, and to the displaying means.

4,041,282

LEAVES COUNTING MACHINE

Isamu Uchida, Chigasaki; Eiichi Kokubo, Urawa, and Minoru Yoshida, Tokyo, all of Japan, assignors to Laurel Bank Machine Co., Ltd., Tokyo, Japan

Filed Jan. 27, 1976, Ser. No. 652,889
Claims priority, application Japan, Jan. 29, 1975, 50-12218
Int. Cl.[2] B61L *1/16*
U.S. Cl. 235—98 R **2 Claims**



1. A sheet separator machine comprising a shaft, a rotary disc fixed to the upper end of said shaft and having a suction hole and a leaf scraping-up piece, a pump positioned below said rotary disc and having a piston fixed to said shaft to define upper and lower pump chambers therein, said upper chamber communicating with said suction hole, means for rotating said shaft and its rotary disc and means for vertically reciprocating said shaft and the rotary disc during their rotation, upon upward movement of said piston by said shaft suction being produced through said suction hole due to reduction in pressure in said lower chamber of said pump.

4,041,283

RAILWAY TRAIN CONTROL SIMULATOR AND METHOD

John E. Mosier, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.

Continuation-in-part of Ser. No. 599,043, July 25, 1975, which is a continuation of Ser. No. 436,700, Jan. 25, 1974, abandoned.
This application Aug. 31, 1976, Ser. No. 719,331
Int. Cl.[2] G05B *17/00*; G05D *1/00*
U.S. Cl. 235—150.2 **20 Claims**

1. A method for simulating operation and control of a railway train having at least one manually operated locomotive in a locomotive set and a plurality of cars, each car of the plurality of cars having a coupler transmitting a coupling force between it and that portion of the train which precedes it in the train, comprising the steps of:

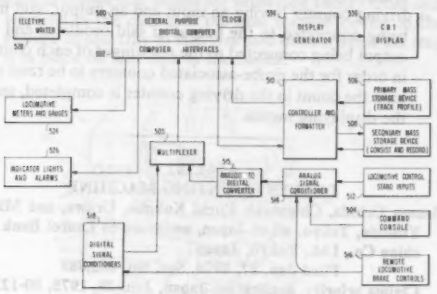
a. providing a simulator control station including a train speed control throttle and a train braking controller each providing a signal related to the degree of operation thereof by a simulator control station operator;

b. providing data related to track profile, train consist, and the location of the train on the track for a predetermined

train and for a predetermined section of track over which the operation of the train is to be simulated;

c. providing data related to locomotive tractive effort and train braking in response to the signals from the control throttle and the train braking controller;

d. calculating from the provided data the coupling forces



between each of a plurality of adjacent cars in the train; and

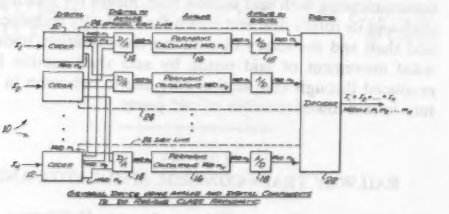
e. displaying to the simulator control station operator each of a plurality of the calculated coupling forces relative to the position in the train of the cars for which the calculations were made whereby operation and control of the railway train is simulated.

4,041,284

SIGNAL PROCESSING DEVICES USING RESIDUE CLASS ARITHMETIC

James W. Bond, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 7, 1976, Ser. No. 720,915
Int. Cl.[2] G06J *1/00*
U.S. Cl. 235—150.5 **8 Claims**



1. Apparatus for performing arithmetical calculations on a plurality, N, of digital input signals, utilizing residue class arithmetic, comprising:

a plurality N of means for coding the N input digital signals into digital modulo m_i integers, $K \geqq i \geqq 1$;

a plurality N of means, each means having an input connected to each coding means, for converting the digital modulo m_i integers into corresponding analog modulo m_i signals;

a plurality N of means for performing a mathematical operation on analog modulo m_i integers, each means having an input connected to a D/A converting means;

a plurality N of means, connected to the N operation means, for converting the analog modulo m_i integers from the operation means into digital modulo m_i integers; and

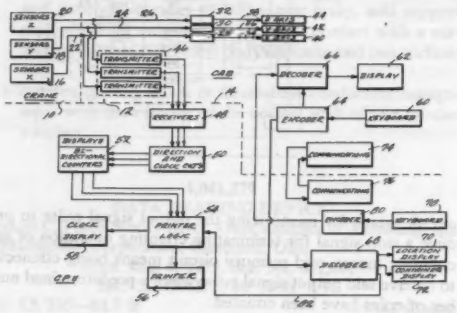
means, connected to the N A/D converting means, for decoding the digital modulo m_i numbers into digital outputs.

4,041,285

BI-DIRECTIONAL MOTION SENSING AND CLOCKING SYSTEM

Jerome E. Shidel, Mill Run, and Harry R. Sampey, Vanderbilt, both of Pa., assignors to Pentron Industries, Inc., Cleveland, Ohio

Filed Apr. 12, 1976, Ser. No. 675,750
Int. Cl.[2] G01S *11/00*; G06F *15/20*
U.S. Cl. 235—150.27 **20 Claims**



1. An electrical bi-directional motion sensing and clocking system for identifying the relative sense and magnitude of movement experienced by a moving body, said system comprising:

a sensor mounting means,

target means mounted for relative motion with respect to said sensor mounting means in a direction and in a magnitude corresponding to the relative direction and magnitude of movements experienced by said moving body,

a first sensor mounted on said sensor mounting means in proximity to the path of said target means and producing a first input signal in response to the passage of said target means thereby,

a second sensor also mounted on said sensor mounting means in proximity to the path of said target means and producing a second input signal in response to the passage of said target means thereby,

said first and second sensors being located relative to one another such that said first and second input signals each occur once in a first sequence for a predetermined increment of movement in a first direction by said moving body and once in a second reverse sequence for a predetermined increment of movement by the body in a second direction opposite to said first direction,

first recording means connected to said first sensor for recording the occurrence of said first input signal,

second recording means connected to said second sensor for recording the occurrence of said second input signal,

output gate means connected to said first and second recording means for producing a clock output signal upon the recorded occurrence of both said first and second input signals,

clearing means connected to said first and second recording means and to said output gate means for clearing the recorded contents of the first and second recording means upon the production of said clock output signal thereby preparing for similar processing of the next succeeding pair of first and second input signals, and

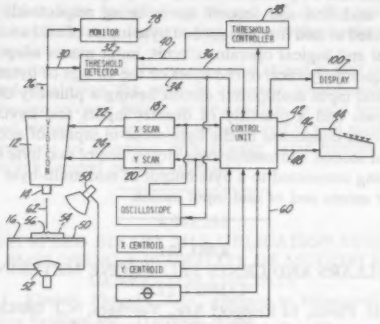
sequence recording means connected to detect whether the first input signal or the second input signal last occurred just prior to the production of said clock output signal and to provide a respectively corresponding sequence output signal representing the input signal sequence and hence direction of body movement to be associated with the increment of body movement represented by said clock output signal.

4,041,286

METHOD AND APPARATUS FOR DETECTING CHARACTERISTIC FEATURES OF SURFACES

Norman R. Sanford, Piqua, Ohio, assignor to The Bendix Corporation, Southfield, Mich.

Filed Nov. 20, 1975, Ser. No. 633,940
Int. Cl.[2] G06F 15/20; H04N 7/02
U.S. Cl. 235—151.3 9 Claims



9. A method of identifying a face of a test object relative to faces of comparison objects, the steps of the method comprising:

identifying individually a plurality of faces of comparison objects by illuminating a face in at least two directions to create a comparison image; producing a comparison signal representative of the relative amount of white and black at two different gray-level thresholds for each face; and storing the comparison signal as representative of the face;

illuminating the test object in at least two directions to create a test image of the test object;

generating a signature signal indicative of the relative amounts of white and black in the test image at corresponding to two different gray-level thresholds; and

comparing the signature signal generated with at least one of the stored comparison signals to identify the test object with respect to the faces of the comparison objects, whereby the face of the test object may be identified as corresponding to one of the faces of the comparison objects.

4,041,287

FINAL SERVO CONTROL IN NC SYSTEMS

Norbert C. Kolell, and John P. Conners, both of Fond du Lac, Wis., assignors to Giddings & Lewis, Inc., Fond du Lac, Wis.

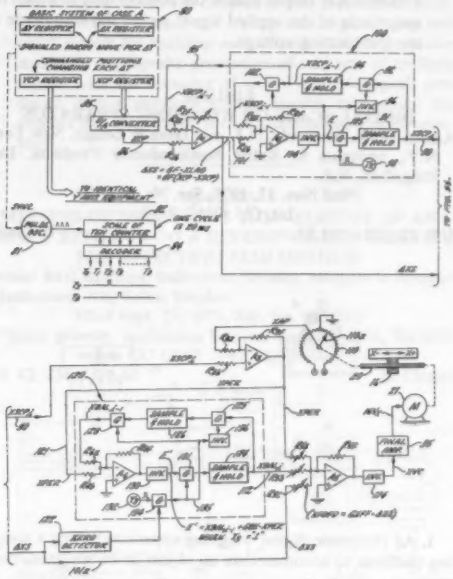
Filed Sept. 8, 1976, Ser. No. 721,404
Int. Cl.[2] G06F 15/46
U.S. Cl. 235—151.11 24 Claims

1. In a method of controlling the velocity and position of a member movable along an axis wherein a primary position command signal (XCP) is changed by incremental amounts ΔX during each of successive time periods, the improvement which comprises:

a. producing a secondary position command signal,

b. changing said secondary command signal at a rate which is proportional to the difference between the primary and secondary command signals, and

c. utilizing said secondary command signal (XSCP) to excite servo power means to keep the actual position of said



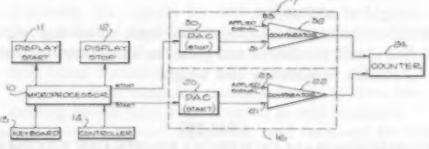
member substantially in agreement with the position represented by said secondary command signal.

4,041,288

VOLTAGE LEVEL DISPLAY CIRCUIT

Arch W. Conway, Mission Viego, and Nelson Urdaneta, La Verne, both of Calif., assignors to Dana Laboratories, Inc., Irvine, Calif.

Filed Sept. 15, 1976, Ser. No. 723,405
Int. Cl.[2] G01R 13/00
U.S. Cl. 235—151.31 10 Claims



1. In an instrument for measuring the voltage-time characteristic of an applied signal having a magnitude which varies as a function of time, to produce a transition in output state at each instant of time at which the magnitude of the applied signal exceeds the magnitude of a fixed, level setting voltage, the combination comprising:

a. means responsive to an input command to select the magnitude at which the level setting voltage is to produced;

b. a controller coupled to said means and responsive to the magnitude selected for the level setting voltage, said controller producing a digital signal representing the level setting voltage;

c. converter means coupled to said controller and responsive to the digital signal for converting said digital signal to an analog voltage;

d. display means coupled to said controller and responsive to the digital signal representing the level setting voltage for displaying its numeric value; and

e. comparator means having a first input coupled to the output of said converter means for receiving said level

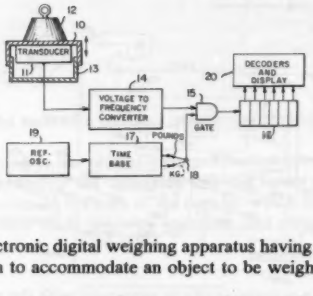
setting voltage and a second input coupled to receive said applied signal, whereby said comparator means produces a transition in output state at the point of time at which the magnitude of the applied signal passes the magnitude of the level setting voltage.

4,041,289

DIGITAL SCALE OR WEIGHING APPARATUS

Amnon Brosh, Montvale, N.J., and Dana F. Geiger, New York, N.Y., assignors to Kulite Semiconductor Products, Inc., Ridgefield, N.J.

Filed Nov. 12, 1975, Ser. No. 631,383
Int. Cl.[2] G01G *9/00*
U.S. Cl. 235—151.33 **10 Claims**



1. An electronic digital weighing apparatus having a weighing platform to accommodate an object to be weighed, comprising:

a. transducer means coupled to said platform and responsive to the weight of said object to provide an analog signal indicative of said weight,

b. a voltage to frequency converter coupled to said transducer means and operative to provide an output frequency linearly related to said analog signal,

c. logic means coupled to said converter for providing a timing signal having a duration selected in accordance with said output frequency to enable a number of pulses indicative of the weight of said object to be transmitted during said duration of said timing signal, wherein the number of pulses transmitted is a direct indication of the weight of said object,

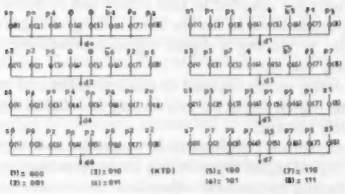
d. utilization means coupled to said logic means and responsive to said number of said pulses as transmitted to display a number manifesting said weight.

4,041,290

MICROPROGRAM CONTROLLED BINARY DECIMAL CODED BYTE OPERATOR DEVICE

Jean-Louis Fressineau, Les Clayes-Sous-Bois, and Maurice Hubert, Versailles, both of France, assignors to Compagnie Internationale pour l'Informatique, Louveciennes, France

Filed Jan. 6, 1975, Ser. No. 539,034
Claims priority, application France, Jan. 7, 1974, 74.00463
Int. Cl.[2] G06F *7/38*
U.S. Cl. 235—156 **10 Claims**



1. A microprogram controlled byte operator device for processing strings of bytes wherein each byte has the same number of binary bit quartets comprising in combination:

a byte arithmetical and logical operator circuit having first and second byte inputs and a byte output;

a multi-byte register means connected to the output of said operator circuit;

first and second addressable byte stores, each capable of storing a plurality of bytes and having a byte write-in input and a byte readout output, the byte readout outputs of said first and second stores being respectively connected to said first and second byte inputs of said arithmetical and logical operator circuit; input means adapted to sequentially receive the bytes of the strings of bytes;

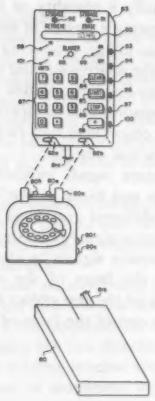
a plural input multiplexer circuit having a plurality of byte inputs and a plurality of quartet inputs and having an output connected to the byte write-in inputs of said first and second addressable byte stores, one of said byte inputs being connected to a byte output of said multi-byte register means and of said input means.

4,041,291

DOLLARS AND CENTS TELEPHONE METERING COMPUTER

Philip D. Pavda, 12 Prospect Ave., Voorhees, N.J. 08043

Filed Dec. 19, 1975, Ser. No. 646,769
Int. Cl.[2] G06F *15/20*
U.S. Cl. 235—156 **3 Claims**



1. An electronic solid state telephone toll call calculator of a size capable of being hand-held or affixed to a telephone by a snap-on arrangement, said calculator comprising:

a display for displaying and noting the running telephone toll cost plus tax in dollars and cents;

a keyboard having ten numerically marked pushbutton keys for entering the numerals 0–9 and four pushbar keys labeled "clear", "start", "stop" and "+";

a calculator chip for computing the running cost of long distance telephone calls and connected to said display;

a calculator memory for storing the values computed by the calculator chip; elapsed minute timer logic means responsive to actuation of the start key for measuring the duration of a long distance telephone call in minute intervals and generating a timing signal at the end of each interval;

cost count logic means responsive to said timing signals for generating a cost signal representative of the cost for each interval measured by the elapsed minute timer logic means;

opto-driver switching and isolator for calculator programing means responsive to said cost signals for enabling the

calculator chip to add the cost represented by each cost signal to the running cost stored in the calculator memory;

tax logic means responsive to actuation of the stop key for directing the calculator chip to compute the tax on the telephone call and add it to the running cost stored in the memory;

means responsive to actuation of said clear key for clearing all circuits within the elapsed minute timer logic means, the calculator chip and the tax logic means;

a blinker light for blinking on and off during telephone conversations to indicate that the calculator circuits are functioning;

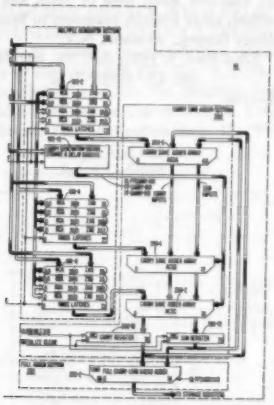
means for retrieving the running cost stored in said memory and displaying the same in response to actuation of a storage retrieve button or key switch on said keyboard; and means for erasing the value stored in said memory in response to actuation of a storage erase button or key switch located on said keyboard.

4,041,292

HIGH SPEED BINARY MULTIPLICATION SYSTEM EMPLOYING A PLURALITY OF MULTIPLE GENERATOR CIRCUITS

Jerry L. Kindell, Phoenix, Ariz., assignor to Honeywell Information Systems Inc., Waltham, Mass.

Filed Dec. 22, 1975, Ser. No. 642,844
Int. Cl.[2] G06F 7/52
U.S. Cl. 235—164 **25 Claims**



1. A high speed multiplication system for performing a multiplication operation upon received signals corresponding to a multiplier and multiplicand, said system comprising:

a plurality of multiple generator means for producing different multiples of said multiplicand, each of said plurality of multiple generator means being connected to receive a different group of said signals of said multiplier and said signals of said multiplicand and each including register means for storing signals representative of at least one multiple generated in response to said different group of multiplier signals and said multiplicand signals;

a corresponding number of series connected levels of carry save adder means for generating sum and carry signals, each of said levels of carry save adder means being connected to a different one of said multiple generator circuits for summing with sum and carry signals from another one of said number of levels of carry save adder means the sets of multiple signals produced by said generator means to generate sum and carry signals, a last one of said levels of adder circuits being connected to apply said sum and carry signals to a first one of said levels of adder means; and,

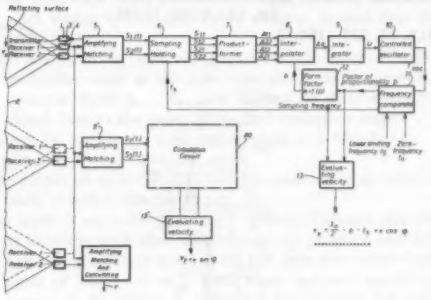
timing control means for generating clock signals defining cycles of operation when said sets of multiple signals produced by said generator circuits are simultaneously applied to each of said levels, said timing control means including circuit means coupled to said plurality of multiple generating means, said circuit means generating said clock signals for enabling each of said multiple generator means to overlap the generation of said sets of multiple signals with the summing of sets of multiple signals produced during previous cycles thereby minimizing the number of cycles for performing said multiplication operation.

4,041,293

METHOD OF MEASURING THE VELOCITY OF AN OBJECT RELATIVE TO A REFERENCE AND A DEVICE FOR EFFECTING SAID METHOD

Gunnar Axel Kihlberg, Sollentuna, Sweden, assignor to Jungner Instrument AB, Solna, Sweden

Filed Sept. 23, 1975, Ser. No. 615,932
Claims priority, application Sweden, Sept. 25, 1974, 7412075
Int. Cl.[2] G01P 3/42; G06G 7/19
U.S. Cl. 235—151.32 **10 Claims**



5. Apparatus for measuring the velocity (v) of an object relative to a reference, comprising:

at least one transmitter at said object for transmitting a signal to a reference;

at least two receivers and associated aerials at said object for receiving the signals by said reference, said receivers being attached to said object at a given geometric distance (l_o) from each other in the measuring direction, said signals being transmitted by said transmitter within a lobe area that is substantially common to the at least two receiving aerials which are coupled to said receivers;

means coupled to said transmitter and receivers for transforming the signals transmitted by said object and those reflected by said reference and received by said object into similar signals but with a time shift (τ_o) between them, the size of said time shift (τ_o) being a function of said geometric distance (l_o) between said receivers and on the velocity (v) of the object relative to said reference in accordance with the relation $l_o = v \cdot \tau_o$, the resultant signals generated by said transforming means being stochastic functions of signals reflected by said reference with respect to the geometric displacement of said object relative to said reference;

correlation means coupled to said transforming means for generating signals (A_{11}, A_{22} and A_{12}, A_{21}) corresponding to the auto- and cross-correlations of the signals received by said receivers, said correlation signals being a function of the geometry of the transmitter-receiver system and of the signal processing and being substantially independent of the reflection properties of said reference, said auto- and cross-correlations of the signals having substantially identical shape yet with a displacement (l_o) of the cross-correlation signals (A_{12}, A_{21}) relative to the auto-correlation signals (A_{11}, A_{22}), one of the cross-correlation signals

being displaced in the positive direction of measurement, and the other signal in the negative direction of measurement;

means coupled to said correlation means for measuring the ratio of the auto- and cross-correlations for a certain time shift (τ, where $\tau < \tau$) of the two signals received by said receivers;

means coupled to said ratio measuring means for interpolating a geometric displacement (l, where $-l_o < l < +l_o$) corresponding to said time shift; and

means coupled to said interpolation means for measuring the velocity (v) of said object relative to said reference in accordance with the relation $v = l/\tau$.

4,041,294

AUTOMATIC ASSEMBLY CONTROL METHOD AND APPARATUS THEREFORE

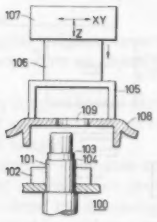
Tadao Inoyama, Yokohama; Tatsuo Goto, Tokyo; Kiyoo Takeyasu, Tokorozawa; Hiroshi Ishimura, Narashino, and Junichi Suzuki, Ichikawa, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Dec. 2, 1975, Ser. No. 636,835

Claims priority, application Japan, Dec. 4, 1974, 49-138393

Int. Cl.[2] B23Q *17/00*

U.S. Cl. 235—151.11 **12 Claims**



1. An automatic assembly control apparatus for assembling together first and second members comprising:

first means for holding one of said first and second members;

second means for driving a drive shaft along the respective axes of a selected, coordinate system;

third means for elastically coupling said first means to said drive shaft;

fourth means, responsive to the displacement of said third means, relative to said first means, for generating a signal representative thereof;

fifth means for selecting a predetermined signal of said signals generated from said fourth means;

sixth means for controlling said second and fifth means, which includes a memory means and an address counter means, said memory means storing predetermined assembly steps for assembling said first and second members, said address counter means being coupled to said memory means and so constructed that the contents of said address counter means are changed in response to the output from said fifth means, said fifth means selecting the predetermined signal in response to an output of said sixth means.

4,041,295

ELECTRONIC TIMEPIECE CALCULATOR

Kazuo Ido, and Mitsuaki Maruyama, both of Suwa, Japan, assignors to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

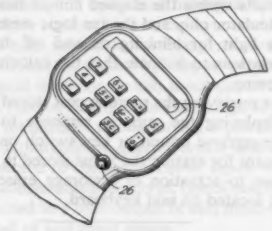
Filed Nov. 7, 1974, Ser. No. 522,085

Claims priority, application Japan, Nov. 7, 1973, 48-125182

Int. Cl.[2] G06F *7/48, 15/02;* G04B *19/30*

U.S. Cl. 235—156 **9 Claims**

1. A calculator input circuit particularly suited for use in an electronic digital display wristwatch having timekeeping circuitry and calculator circuitry, the improvement comprising a plurality of input means each said input means being adapted to supply to said calculator circuitry data signals representative of numerical information and operating functions, said operating functions effecting processing in said calculator circuitry of said numerical information supplied by said data signals; means for indexing through said plurality of input means to select a



plurality of at least one of said numerical information and operating functions; and manually operable switch means for selectively applying a selected number or function to said calculator means when said selected number or function is indexed by said indexing means.

4,041,296

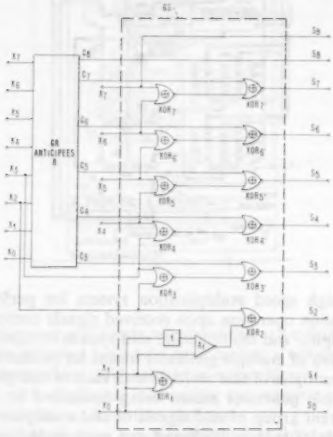
HIGH-SPEED DIGITAL MULTIPLY-BY-THREE-DEVICE

Alain Dauby; Vladimir Riso, both of Nice, and Daniel Roger-Rodés, Antibes, all of France, assignors to International Business Machines Incorp., Armonk, N.Y.

Filed Dec. 3, 1975, Ser. No. 637,359

Int. Cl.[2] G06F *7/52*

U.S. Cl. 235—164 **3 Claims**



1. Apparatus for generating a three times multiple of a binary number X having orders X_0, X_1, X_2, X_3, X_4 . . et sequence comprising, in combination,

a. a multi-order sum generator which receives as one input signals representative of the orders of said X number X_0, X_1, X_2, X_3, . . . et sequence in corresonding orders of said sum generator to obtain in effect an entry of one times said X number into said sum generator;

b. circuit routing means arranged in said sum generator for inputting the signals representative of each order X_0, X_1, X_2, X_3 . . . et sequence of said X number also to the succeeding higher order of said sum generator to obtain in effect an entry of two times said X number into said sum generator;

c. a multi-order carry circuit for generating the carry bit for

each stage of order $k+1$ of said sum generator by means of logic circuits providing

$$C_{k+1}=X_kX_{k-1}+(X_{k-1}X_{k-2}+\ldots+X_{k-j}X_{k-3}X_{k-5}\ldots X_1)+(X_kX_{k-2}X_{k-3}+\ldots+X_kX_{k-2}X_{k-4}\ldots X_0)$$

where k is any integer n taking on a value from two et sequence, said orders $X_0, X_1, X_2, X_3, X_4, \ldots$ et sequence of said input number X also being applied to said carry generator, and wherein for said binary number X a carry signal bit is generated for each order starting at order three et sequence;

d. a separate carry generating means included within said sum generator and responsive also to the second order of said X value and the first order of said routed X-Valve to separately generate a carry digit for entry to the third order of said sum generator;

e. and means applying each carry signal generated by said multi-order carry circuit as an input to the related order of said sum generator, and any carry signal generated by said separate carry generator for input to said third order of the sum generator, said inputs of said one times said X-value, two times said X-value and the carry signals generating on multi-order outputs of said sum generator, a three times multiple of said binary number X.

4,041,297

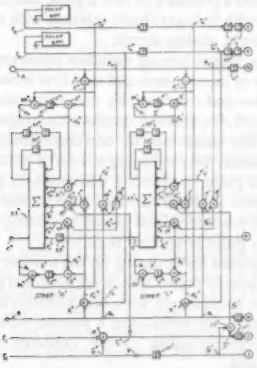
REAL-TIME MULTIPLIER WITH SELECTABLE NUMBER OF PRODUCT DIGITS

Harold V. Jesse, 11 Granite St., Cambridge, Mass. 02139

Continuation of Ser. No. 530,225, Dec. 6, 1974, abandoned, which is a continuation of Ser. No. 380,991, July 19, 1973, abandoned, which is a continuation of Ser. No. 174,897, Aug. 24, 1971, abandoned. This application Sept. 17, 1975, Ser. No. 614,143

Int. Cl.[2] G06F *7/52*

U.S. Cl. 235—164 **5 Claims**



1. A real time multiplier for multiplying digital serial operand electrical signals representing a multiplicand, $a_0a_1\cdots a_{n-1}$ and a multiplier $b_0b_1\cdots b_{n-1}$ to provide a product $c_kc_{k+1}\cdots c_{2n-1}$, wherein $0\leqq k\leqq 2n-1$ comprising

a plurality of serially connected multiplier stages,

a first, second, third, fourth, fifth and sixth electrically conducting lines,

means for simultaneously applying each of the multiplicand and multiplier signals serially at a fixed rate in time coincidence to the input terminals of said first and second lines, respectively, with the signals corresponding to the least significant digit a_o, b_o, being applied first,

a plurality of delay elements each having a delay of one digit-time-duration,

said first and second lines being connected to corresponding inputs of each multiplier stage, said first and second lines having a delay element in each line between alternate mutiplier stages, the first delay element being in said first and second lines between the connections to the inputs of the second multiplier stage **1** and the third multiplier stage **2**,

means for applying a first gating pulse to the input terminal of the third line t_a connected to one input of each multiplier stage, said third line t_a having a delay element between corresponding inputs of each multiplier stage and an additional delay element in line t_a between the multiplier stages having said delay elements in said first and second lines, said first gating pulse being in time coincidence with the least signficant digits a_o, b_o of the operands at the input to said multiplier,

means for applying a second gating pulse to the input terminal of a fourth line t_b connected as a second input to each multiplier stage, said fourth line t_b having a delay element between corresponding inputs of each multiplier stage and an additional delay element in line t_b between the multiplier stages having said delay element in said first and second lines,

said second gating pulse being applied to the input of the first multiplier stage at the same time as the most significant operand digits a_{n-1}, b_{n-1} are applied on their respective signal lines to the input of the first multiplier stage,

means for applying a third gating pulse to a fifth line t_d,

a plurality of two-input OR gates,

the output of each OR gate being connected as an input to each of said multiplier stages,

the input of each OR gate being connected to said fifth line at locations such that said third gating pulse on said fifth line is applied as an input to the OR gate connected to the input of stage $n/2$ at a time when operand signal $a_{n/2}$ arrives to be stored in stage $n/2$ for n even, (or stage $(n+1)/2$ and at a time when operand signal $a_{(n+1)/2}$ arrives to be stored in stage $(n+1)/2$ for n odd,) said fifth line t_d containing a means for delay of one pulse interval between the first and second stages and alternate stages following the second stage,

the OR gate whose output is connected to the input of the first multiplier stage **0** also being connected to the input of the sixth line, the sixth line being connected as an input to each OR gate connected to the remaining multiplier stages,

said sixth line containing a delay element of unit-pulse-length delay after the second multiplier stage **1** and the following alternate multiplier stages,

said third gating pulse being of time duration equal to that of two signal digits,

means for effecting the storage of each successive digit of the multiplier and multiplicand in each successive serially-connected multiplier stage in response to the first gating pulse on said third line t_a and the multiplicand and multiplier on said first and second lines, respectively,

means for effecting the removal by gating from storage of said stored digit in each stage in response to the second gating pulse on line t_b,

means for summing and providing a carry in the summing means of each stage of those product terms a_ib_j where $i+j=r$ and where $k\leqq r\leqq 2n-1$, $r=2n-1$ for the first multiplier stage and increasing by one for each stage until $r=k$ for the last stage, said product terms being provided to the input of said summing means from said storage means and the delayed output of the summing means of the next successive stage,

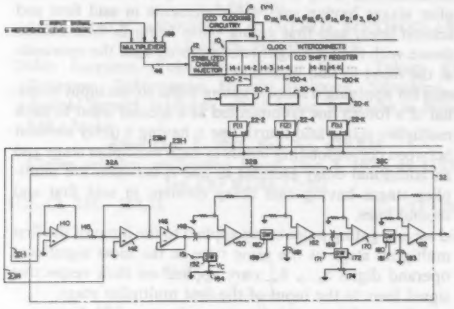
means for delaying the summed product terms, a_ib_j of the output of a summing means of each stage by a delay element between the output of the summing means of a stage and an input of the summing means of a preceding stage,

the first multiplier stage producing at its output c^e the product terms c_k, c_{k+1},---c_{2n-1} in serial time sequence.

4,041,298
FLOATING CLOCK SENSOR FOR BUFFERED, INDEPENDENT, NON-DESTRUCTIVE READOUT OF CHARGE TRANSFER DEVICES

Donald R. Lampe, Ellicott City, and Marvin H. White, Laurel, both of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 507,115, Sept. 17, 1974. This application Oct. 24, 1975, Ser. No. 625,697
Int. Cl.[2] G06G 7/12; H03K 5/159
U.S. Cl. 235—193 16 Claims



1. A system for providing non-destructive readout from a charge transfer device wherein said charge transfer device includes plural stages each defined by a corresponding group of plural electrodes and at least one of said stages comprises an output stage wherein one of said group of plural electrodes thereof comprises a predetermined sensor electrode in which a voltage is induced by a charge packet propagating through the corresponding stage, comprising:

control means for supplying clocking signals to respective ones of said plural electrodes of each of said stages to shift a charge packet through the successive stages of said charge transfer device at a predetermined cyclic shift rate, and defining in each shift cycle thereof a succession of reset, clamp, mux, and sample intervals in relation to the said clocking signals, said control means generating a reset signal in timed relation to said clocking signals for defining said reset interval,

switching means connected to the said predetermined sensor electrode and to said control means for receiving the clocking signal associated with said sensor electrode, said switching means normally being open so as to isolate said sensor electrode from said clocking signal and said control means,

said switching means being rendered conductive in response to said reset signal, for applying said corresponding clocking signal to said sensor electrode to render the latter repulsive and then attractive during said reset interval, said control means applying corresponding clocking signals to others of said group of electrodes of said output stage during said reset interval to isolate said sensor electrode from charge packets propagating through said charge transfer device prior to said sensor electrode clocking signal rendering said sensor electrode attractive during said reset interval,

said control means terminating said reset signal and opening said switching means thereby to isolate said sensor electrode from said clocking signal and said control means, said sensor electrode maintaining said attractive potential condition thereof, during said clamp, mux, and sample intervals,

said corresponding clocking signals applied to others of said electrodes of said group advancing a charge packet to the potential well of said sensor electrode during said mux interval and confining said charge packet therein during said sample interval,

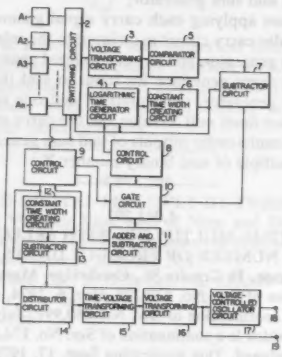
means connected to said sensor electrode for sampling the potential induced therein by the charge packet retained in the potential well thereof during said sample interval and producing an output signal sample representative thereof, and

said sample interval terminating prior to a next successive reset interval.

4,041,299
MULTIPLICATION APPARATUS

Nobuaki Miyakawa, Hitachi, Japan, assignor to Hitachi, Ltd., Japan

Filed Mar. 30, 1976, Ser. No. 671,988
Claims priority, application Japan, Apr. 4, 1975, 50-40269
Int. Cl.[2] G06G 7/16, 7/24
U.S. Cl. 364—841 4 Claims



1. Multiplication apparatus comprising:

a plurality of input means each receiving an input analog signal to be multiplied;

a first means for producing a first pulse in response to said input signal to thereby convert said plurality of input signals into a plurality of first pulses, said first pulse having a time width in logarithmic relation with the analog value of said input analog signal;

a switching means having switches connected between said plurality of input means and said first means, said switches being changed-over one by one sequentially in predetermined order to thereby conduct said input analog signals to said first means one by one sequentially;

a second means for producing a train of pulses in response to said first pulse to thereby convert said plurality of first pulses into a plural train of pulses, said train of pulses having a predetermined period and being produced while said first pulse is applied thereto;

a counter means for counting up the number of pulses of said plural trains of pulses which are supplied from said second means in accordance with said predetermined order;

a third means for producing a second pulse having a time width corresponding to the contents of said counter means; and

a fourth means for converting said second pulse into a signal having a voltage which is in antilogarithmic relation with said time width of said second pulse.

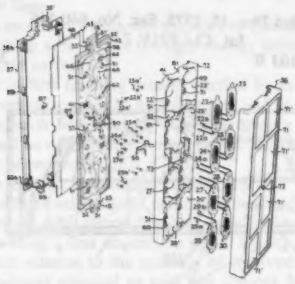
4,041,300
PHOTOFLASH ARRAY WITH DISCHARGE PATH FOR ELECTROSTATIC CHARGES

Richard Blount, South Euclid, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Filed Oct. 28, 1975, Ser. No. 626,339
Int. Cl.[2] G03B 15/02; H05F 3/00
U.S. Cl. 240—1.3 9 Claims

1. A flash lamp array comprising a walled hollow housing

containing flash lamps and circuitry including electrical ground, conductive material on at least a portion of the outer surface of said housing, and means providing a path through



the wall of said housing for electrostatic discharges between said conductive material and said electrical ground, thereby reducing the possibility of accidental flashing of lamps by said electrostatic discharges.

4,041,301

KEY ILLUMINATING DOOR HANDLE

Paul F. Pelchat, Plymouth, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Mar. 24, 1976, Ser. No. 670,056
Int. Cl.[2] E05B *17/10*
U.S. Cl. 240—2.13 **3 Claims**

1. In a vehicle door having a recess in the outer panel thereof, a door latch, a lift bar type door handle mounted on the door for movement between a first position overlying the recess and a second position outwardly of the recess to operate the door latch, and a key cylinder for operating a door lock, the improvement comprising: a light emitting means mounted on the vehicle door within the recess and covered by the handle when the handle is in the first position overlying the recess, reflective means on the undersurface of the handle for directing light from the light emitting means to the key cylinder when the handle is moved outwardly of the recess to the second position, and switch means operative upon movement of the handle to the second position for energizing the light emitting means.

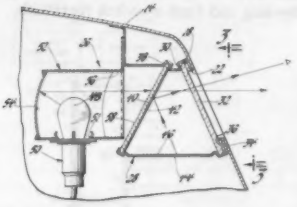
4,041,302

DUAL COLOR TAILLAMP

Vilho Koljonen, Warren, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed July 6, 1976, Ser. No. 702,672
Int. Cl.[2] B60Q *1/30, 1/34, 1/44*
U.S. Cl. 240—8.3 **2 Claims**

1. A concealed lamp assembly for association with contiguous panel structures of vehicles comprising a housing having an exterior lens of light transparent material, an interior lens of light transparent material having a semi-transparent light reflective metallic coating facing the exterior lens, a colored surface interposed between said interior and exterior lens to receive outside ambient light from said exterior lens, said interior lens being disposed angularly with respect to said exterior lens and said colored surface to reflect an image of said colored surface from said coating through said exterior lens to cause said interior lens to appear opaque under ambient light condi-



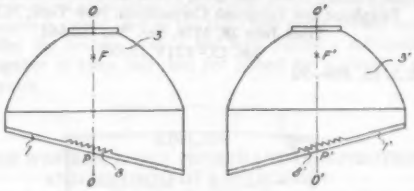
tions and to produce a first apparent lamp light color when the lamp is not illuminated, a lamp and reflector for illuminating the interior lens to direct light from said exterior lens when the light is energized to produce a second apparent lamp light color when the lamp is illuminated, said semi-transparent coating further serving to intercept outside ambient light directed at said reflector and redirect such intercepted light when said lamp is deenergized.

4,041,303

VEHICLE HEADLAMPS

Jacques Ricard, Fontenay sous Bois, France, assignor to Cibie Projecteurs, Bobigny, France

Filed Aug. 4, 1975, Ser. No. 601,547
Claims priority, application France, Aug. 23, 1974, 74.28980
Int. Cl.[2] F21M *3/04*
U.S. Cl. 240—41.4 R **3 Claims**



1. A lighting system for a motor vehicle comprising a right-hand and a left-hand headlamp, the headlamps having optical axes which are substantially parallel to one another and to a central longitudinal plane extending between them, along said vehicle, the head-lamps having front lenses which are symmetrically inclined on either side of the said central plane, each lens having a region of prismatic elements for lateral spread of the beam, each element having a pair of plane surfaces inclined to one another, and intersecting one another along a linear edge; one surface being inclined to the optical axis and the other surface lying exactly parallel to the optical axis.

4,041,304

FLASHLIGHT

Samuel Spector, Box 404, York Beach, Maine 03910

Filed Jan. 22, 1976, Ser. No. 651,344
Int. Cl.[2] F21D *7/00;* F21V *23/04*
U.S. Cl. 240—10.68 **3 Claims**

1. A disposable flashlight, comprising

a. at least one metal-clad cylindrical battery,

b. a dielectric cylindrical sleeve engaging the sides of said battery and coextensive therewith,

c. the lower end of said sleeve being crimped over the lower end of said battery

d. said sleeve being formed with a relatively small opening to expose the metal side of said battery,

e. a narrow strip of aluminum foil slightly wider than said opening bonded to the outer surface of said sleeve and extending lengthwise therealong from the upper end of said sleeve to at least over said opening to fully cover said opening and form a switch therewith,

f. a head mounted in the upper end of said sleeve,

g. said head being formed with an electrically conductive sleeve adapted to engage the upper, inner face of said sleeve and contact said strip,

h. conductive reflector integral with said sleeve and a bulb mounted to said reflector and in contact with said battery, and,

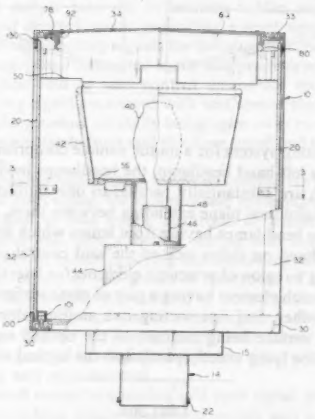
i. the upper end of said sleeve being crimped over said head.

4,041,305

LUMINAIRE USING ONE-WAY MIRROR AS EXTERIOR LENS

John Richard Dean, Memphis, Tenn., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed June 28, 1976, Ser. No. 700,461
Int. Cl.² F21V *13/00*
U.S. Cl. 240—92 **9 Claims**



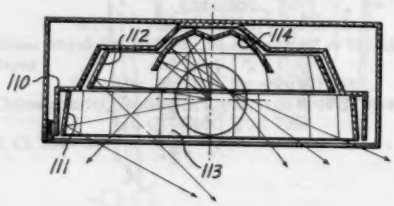
1. A luminaire having a light source enclosed by a plurality of panels for transmitting light from said source, at least one of said panels spaced from said source and reflective of light from outside said luminaire while emitting light from said source when said source is energized, a pair of baffles extending radially from said source toward respective ends of said panel to render said luminaire opaque to light passing into said panel with the light source de-energized.

4,041,306

LUMINAIRE AND REFLECTOR THEREFOR

Wayne W. Compton, Irvine, and Robert Paul Draper, Sunland, both of Calif., assignors to Kim Lighting, Inc., City of Industry, Calif.

Filed Dec. 15, 1975, Ser. No. 640,466
Int. Cl.² F21V *7/09*
U.S. Cl. 240—103 R **32 Claims**



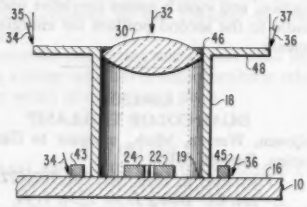
1. A reflector having a nominal axis of emission for casting a pattern of light which is substantially rectangular in a plane normal to said axis of emission from a lamp which has an axis of radiation and the property of emitting a disproportionately larger percentage of its luminous flux in an annulus which lies between a substantial bounding region at each end of the lamp boundary, in which said boundary regions the emission is disproportionately low, said reflector having a concave cavity, a cutoff edge forming an aperture opening from said cavity, said aperture being devoid of any refracting element and of any reflecting element, said cutoff edge lying in a plane normal to said nominal axis, support means to mount the lamp in the cavity above the cutoff edge, and specularly reflecting means shaped and placed in the cavity whereby to reflect supplementary light rays comprising at least some of the light rays emitted from the lamp in the angular subtense above the limiting rays which graze the cutoff edge into a pattern supplementary to direct rays which pass directly from the lamp through the aperture to the surface in ares on the surface where the direct rays provide insufficient illumination to form a substantially rectangular pattern with a predetermined luminar intensity on areas of said surface which is a function of the distance of the respective areas from the intersection of nominal axis with the surface, said supplementary light rays, together with the direct rays, providing such illumination over substantially the entire pattern.

4,041,307

POSITIONING A PLATFORM WITH RESPECT TO RAYS OF A LIGHT SOURCE

Louis Sebastian Napoli, Hamilton Square, and Richard Everet Marx, Jamesburg, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed June 7, 1976, Ser. No. 694,044
Int. Cl.² G01J *1/20*
U.S. Cl. 250—203 R **5 Claims**



1. Apparatus for maintaining a platform in a desired attitude with respect to rays from a source of light energy, comprising:

an opaque, open-ended, tubular member having a bottom

disposed upon a surface of said platform to enclose a tracking area thereon where a first imaginary line is a projection of an axis of rotation of said platform and a second imaginary line is substantially orthogonal to said first line;

a lens mounted within said member to concentrate upon said tracking area rays of the light energy substantially normal to said surface;

a pair of first tracking sensors carried by said tracking area on opposite sides of said first line and along said second line, each first tracking sensor providing a first tracking signal having an amplitude in direct relation to the quantity of received light;

a pair of first acquisition sensors, carried by said surface outside of said tubular member along said second line on opposite sides of said first line, each first acquisition sensor providing a first acquisition signal having an amplitude in direct relation to the quantity of received light; and

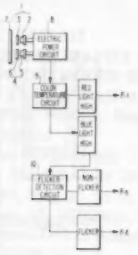
a transducer coupled to said first sensors for rotating said platform about said axis in response to a difference between said first tracking signals and in response to a difference between said first acquisition signals.

4,041,308

AUTOMATIC CONTROL DEVICE FOR CORRECTING FILTERS

Yoshihiro Fujita, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed May 11, 1976, Ser. No. 685,219
Claims priority, application Japan, May 13, 1975, 50-56972
Int. Cl.[2] G01J *3/34*
U.S. Cl. 250—226 **7 Claims**



1. An automatic filter selection apparatus, for selecting from a plurality of light condition correcting filters the proper ones for use in a photography operation, comprising

a. a first discriminator means responsive to the spectral characteristic of an illuminating source of light for providing a first output signal, the condition of which indicates whether or not the illuminating source of light is incandescent lighting,

b. a second discriminator means responsive to the amount of flicker is an illuminating source of light for providing a second output signal, the condition of which indicates whether or not the illuminating signal is sunlight,

c. first logic means responsive to said first and second output signals for generating a group of logic output signals, the condition of which indicates whether the illuminating light is sunlight, incandescent or fluorescent,

d. first selecting means responsive to said group of logic signals for selecting a correcting filter from a first set of said correcting filters in dependence upon the condition of said logic signals,

e. second selecting means responsive to said group of logic signals for selecting a correcting filter from a second set of said correcting filters in dependence upon the condition of said logic signals, and

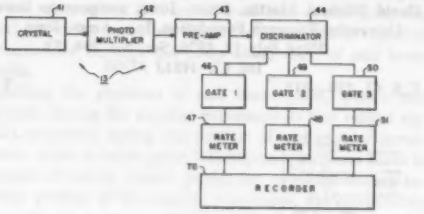
f. switching means for selectively applying said group of logic signals to said first and second selecting means.

4,041,309

BACKGROUND SUBTRACTION SYSTEM FOR PULSED NEUTRON LOGGING OF EARTH BOREHOLES

Eric C. Hopkinson, Houston, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Sept. 2, 1976, Ser. No. 719,758
Int. Cl.[2] G01V *5/00*
U.S. Cl. 250—262 **10 Claims**



1. Apparatus for radioactivity well logging, comprising:

an elongated instrument adapted to traverse an earth borehole;

a source of neutrons within said instrument;

radiation detection means within said instrument in spaced relation to said source, said detection means including means to generate electrical signals indicative of such detected radiation;

first, second and third gates within said instrument connected to the output of said detection means; and

means within said instrument to repetitively pulse said neutron source and to trigger said first, second and third gates in timed relationship with the pulsing of said neutron source, said means being characterized by the gate widths of said first and second gates being substantially equal, by the gate width of said third gate being substantially wider than the widths of said first and second gates, by the first and second gates being opened after each time the neutron source is pulsed, and by the third gate being opened only after the neutron source has been pulsed a substantial number of times and then not pulsed for a plurality of cycles.

4,041,310

WATER WASHABLE DYE PENETRANT COMPOSITION AND METHOD OF APPLICATION

Orlando G. Molina, Westminster, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Division of Ser. No. 580,258, May 23, 1975, Pat. No. 4,011,174, which is a continuation-in-part of Ser. No. 444,433, Feb. 21, 1974, Pat. No. 3,915,886, and Ser. No. 521,730, Nov. 7, 1974, Pat. No. 3,939,092. This application Sept. 7, 1976, Ser. No. 721,603
Int. Cl.[2] G01N *21/16*
U.S. Cl. 250—302 **13 Claims**

1. A method for detecting cracks and flaws in the surface of an object which comprises applying to said surface a biodegradable liquid dye penetrant composition consisting essentially of (1) a biodegradable nonionic surfactant which consists essentially of ethoxylates of linear secondary aliphatic alcohols, with the hydroxyl groups randomly distributed, the linear aliphatic portion of said alcohols being a mixture of alkyl chains containing in the range from 10 to 17 carbon atoms, and containing an average of from 3 to 12 moles of ethylene oxide, (2) a dye soluble in said surfactant and (3) glycol monobutyl ether as extender, applying a water wash to the surface of said object over said dye penetrant composition thereon, and preferentially removing said glycol monobutyl ether from said dye penetrant composition, followed substantially instantaneously by removing the remaining liquid dye penetrant uniformly distributed on said surface, during said water wash application, a portion of said last mentioned liquid penetrant free of said

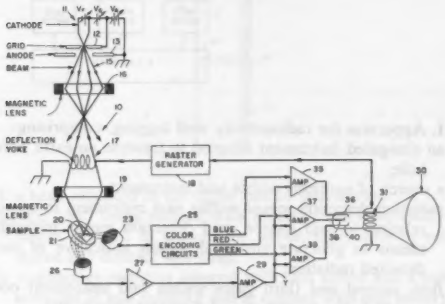
glycol monobutyl ether remaining in said cracks and flaws in said surface, and viewing the surface of said object under lighting conditions to obtain colored traces from the dye in said cracks and flaws.

4,041,311

SCANNING ELECTRON MICROSCOPE WITH COLOR IMAGE DISPLAY

David Michael Martin, Ames, Iowa, assignor to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed July 12, 1976, Ser. No. 704,181
Int. Cl.[2] H01J *37/00*
U.S. Cl. 250—311 **7 Claims**



1. In combination with a scanning electron microscope having a primary electron beam impinging on a sample of material located in a target area and first deflection means including raster generator means for moving said primary beam in a predetermined pattern on said sample, an improved display system comprising: first detector means for detecting a first phenomenon induced from said sample in response to the impingement thereon of said primary electron beam and for generating a first signal representative thereof; color encoding circuit means receiving said first signal for generating first, second and third color signals therefrom, each color signal being a changing function of said first signal over at least a portion of the range of said first signal; color kinescope means having first, second and third electron beams, each generating a different color response in said kinescope means and responsive to said first, second and third color signals respectively, and said deflection means responsive to said raster generator means for deflecting said first, second and third electron beams in a pattern corresponding to said predetermined pattern, whereby said kinescope means generates a color image of said sample and the hue of said image at any point is representative of said first signal at the corresponding point on said sample; second detector means for detecting a second phenomenon induced from said sample in response to the impingement thereof of said primary electron beam and for generating a second signal representative thereof; and means responsive to said second signal for modulating the brightness of said color kinescope means in accordance with the detection of said second phenomenon.

4,041,312

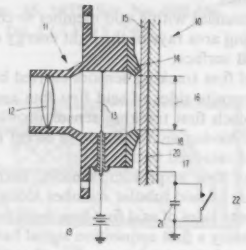
APPARATUS FOR ELECTROSTATICALLY CHARGING AN ELECTROPHOTOGRAPHIC FILM

John D. Plumadore, Westfield, Mass., assignor to A. B. Dick/-Scott, S. Hadley, Mass.

Filed Apr. 23, 1975, Ser. No. 570,822
Int. Cl.[2] G01M *21/34*
U.S. Cl. 250—315 R **6 Claims**

1. In an apparatus for electrostatically charging an electrophotographic film comprising a photoconductive layer and a conductive layer with a corona source, wherein the film is held stationary with respect to the corona source during charging, the improvement comprising:

a capacitor interconnecting the conductive layer of the film



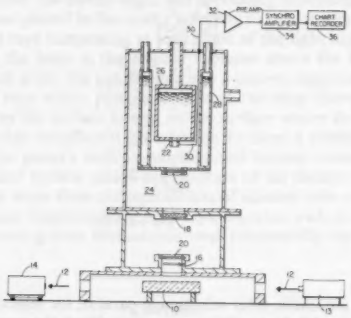
with ground, the capacitor having a value smaller than the capacitor value of the portion of the film being charged, whereby the amount of charge deposited upon the film during corona charging is limited.

4,041,313

EMITTANCE CALORIMETRIC METHOD

Roy F. Potter, San Diego, and Donald L. Stierwalt, El Cajon, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 3, 1975, Ser. No. 628,261
Int. Cl.[2] G01N *21/22*
U.S. Cl. 250—341 **8 Claims**



1. A method of making a precise measurement of the absorption of weakly absorbing optical materials by measuring the temperature rise of the sample when light of the wavelength of interest passes through said sample, comprising the steps of:

a. passing light of a first predetermined wavelength through a sample of the weakly absorbing material;

b. measuring the rate of increase in power emitted by said sample at a second predetermined wavelength.

4,041,314

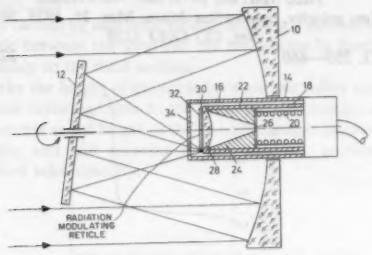
DETECTOR DEVICE RESPONSIVE TO INFRARED RADIATION

Hans Oppelt, Uberlingen, Bodensee, Germany, assignor to Bodenseewerk, Geratetechnik GmbH, Uberlingen, Bodensee, Germany

Filed May 3, 1976, Ser. No. 682,270
Claims priority, application Germany, Sept. 19, 1975, 2541818
Int. Cl.[2] G01J *1/42*
U.S. Cl. 250—352 **2 Claims**

1. In a detector device responsive to infrared radiation and including a double-walled vessel having an inner wall which forms a cooling means container and an outer wall, the two

walls defining a vacuum chamber; a detector element to be exposed to the infrared radiation located within said vacuum chamber in heat-conducting connection with the cooling means container, said detector element being exposed to the infrared radiation in an imaging path of rays through the end of the outer wall; an opaque screen located in the vacuum chamber, said screen enclosing the detector element and defining a radiation entrance aperture and being also in heat-conducting



connection with the cooling means container; optical imaging means arranged in the radiation entrance aperture of the opaque screen; and a radiation modulating reticle located in the image plane and being partly transparent and partly opaque, the improvement comprising:

the reticle being located in the vacuum chamber and in heat-conducting connection with the cooling means container.

4,041,315

COMPUTERIZED TOMOGRAPHY COMPRISING LATERALLY SHIFTING DETECTED BEAMS WITHIN A ROTATED FAN OF RADIATION

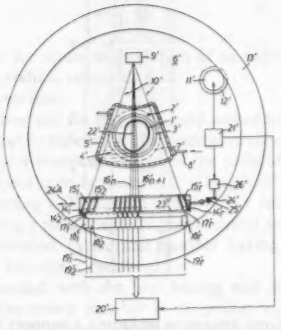
Godfrey Newbold Hounsfield, Newark, England, assignor to E M I Limited, Hayes, England

Continuation of Ser. No. 489,084, July 17, 1974, Pat. No. 3,934,142, and Ser. No. 481,443, June 20, 1974, which is a division of Ser. No. 358,980, May 10, 1973, Pat. No. 3,881,110. This application Jan. 19, 1976, Ser. No. 650,281

Claims priority, application United Kingdom, May 17, 1972, 23064/72; July 21, 1973, 34859/73

Int. Cl.[2] A61B *6/02;* **G01N** *23/08;* **H05G** *1/30*

U.S. Cl. 250—360 **1 Claim**



1. A method of radiographically examining the body of a patient in order to produce an image of the variation of absorption coefficient, with respect to penetrating radiation, over a planar region disposed in said body, comprising the steps of:

a. projecting radiation through the body, in the plane of said region, from a position external of the body; the radiation conforming to a fan-shaped spread of angle which substantially equals, or exceeds, the angle subtended at said position by said region,

b. scanning said spread of radiation relative to the body so as to irradiate said region from a plurality of different positions; the scanning consisting of an angular movement about an axis substantially perpendicular to said region,

c. detecting the radiation emergent from the body, in said plane, along each of a plurality of mutually divergent beam paths within said spread from each of said positions, and providing an output signal indicative of the radiation transmitted through the body along each of said beam paths,

d. shifting the positions of said beam paths, within said spread, during the angular movement so that output signals, provided during one portion of said angular movement, relate to beam paths interleaved with beam paths in respect of which output signals are provided during another portion of the angular movement, the relationship between the scanning and the shifting being such that the region is irradiated from a plurality of said positions during each of said portions, and

e. processing the output signals to produce said image.

4,041,316

FIELD EMISSION ELECTRON GUN WITH AN EVAPORATION SOURCE

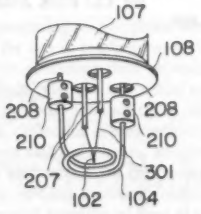
Hideo Todokoro, and Tsutomu Komoda, both of Tokyo, Japan, assignors to Hitachi, Ltd., Japan

Filed Sept. 17, 1975, Ser. No. 614,311

Claims priority, application Japan, Sept. 20, 1974, 49-107819; Aug. 13, 1975, 50-97656; Aug. 13, 1975, 50-97657; Aug. 13, 1975, 50-97658

Int. Cl.[2] H01J *29/48*

U.S. Cl. 250—396 R **3 Claims**



1. A method of starting a field emission electron gun having a vacuum chamber, a field emission tip disposed in said vacuum chamber, an anode spaced apart from said field emission tip and defining a space therebetween in which said field emission tip emits electrons, and vacuum pump means for evacuating said vacuum chamber, the method serving to prevent electrons emitted from said field emission tip from causing deteriorating gas molecules from being drawn out of the surfaces within said vacuum chamber comprising the steps of:

a. operating said vacuum pump means to evacuate said vacuum chamber to a predetermined degree of vacuum;

b. vaporizing a material for a predetermined time adjacent said field emission tip while said vacuum pump means is still operating to form protective evaporation layers on those surfaces within said vacuum chamber from which said deteriorating gas molecules would otherwise be drawn out by said emitted electrons; and

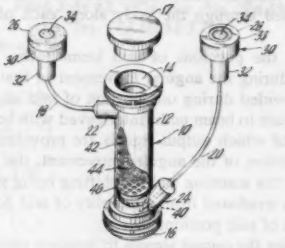
c. after vaporizing said material for said predetermined time, connecting a voltage source means to said field emission tip to cause electrons to be emitted therefrom.

4,041,317

MULTIPLE PH ALUMINA COLUMNS FOR MOLYBDENUM-99/TECHNETIUM-99M GENERATORS

Nabil A. Morcos, Kendall Park; Gerald A. Bruno, Shrewsbury, and Thomas A. Haney, East Brunswick, all of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed May 19, 1976, Ser. No. 687,713
Int. Cl.[2] G01M *21/24*
U.S. Cl. 250—432 PD 10 Claims



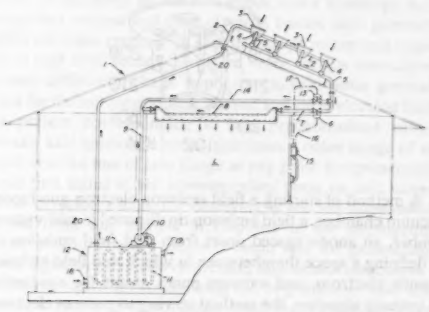
1. Apparatus for the generation of technetium-99m from molybdenum-99 comprising an alumina support medium for adsorption of the molybdenum-99, means for containing said alumina support medium, inlet means for receiving eluant, and outlet means for removing eluate, wherein said alumina support medium comprises at least two beds of alumina, a first bed having a pH above about 6.0 and a second bed having a pH below about 6.0, the difference in the pH of the two beds being at least 0.5.

4,041,318

SOLAR HEAT-LIGHT RECOVERY SYSTEM

Harold W. Poulsen, Arlington Heights, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Mar. 1, 1976, Ser. No. 662,985
Int. Cl.[2] F21K *2/02*
U.S. Cl. 250—459 4 Claims



1. A method for effecting the useful recovery of energy from solar radiant energy which comprises:

a. passing a fluid stream with entrained phosphorescent particles to a solar radiant energy exposure zone and effecting the absorption of both heat and light energy into such particles and stream,

b. passing at least a portion of the resulting light regenerated phosphorescent particles in the carrying fluid stream to a light release zone and providing for the passage of such particles through light emitting containment means to, in turn, provide for light emission therefrom into said light release zone, and

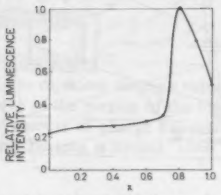
c. subsequently returning the stream and particles to said solar energy exposure zone for reheating and re-exposure to sunlight.

4,041,319

RADIOGRAPHIC PHOSPHOR SCREEN

Tadashi Fukuzawa, Tokyo; Teruki Suzuki, Funabashi, and Shigeru Sato, Matsudo, all of Japan, assignors to Hitachi, Ltd. and Hitachi Medical Corporation, both of, Japan

Filed Mar. 26, 1976, Ser. No. 670,833
Claims priority, application Japan, Mar. 26, 1975, 50-35537
Int. Cl.[2] G01J *1/58*
U.S. Cl. 250—460 22 Claims



1. A radiographic phosphor screen comprising a substrate and, supported thereon, a phospho-vanadate phosphor represented by the following general formula:

$$M(P_x, V_{1-x})O_4$$

wherein M stands for at least one element selected from the group consisting of Y, La, Lu and Gd, and x is a number of from 0.7 to 0.99.

4,041,320

TELESCOPIC COLUMN FOR X-RAY APPARATUS

William H. Amor, Jr., Auburn Township, Cuyahoga County, and Robert J. Steffek, Wickliffe, both of Ohio, assignors to Picker Corporation, Cleveland, Ohio

Division of Ser. No. 418,128, Nov. 21, 1973, Pat. No. 3,986,697.
This application June 4, 1976, Ser. No. 692,976
Int. Cl.[2] G03B *41/16*
U.S. Cl. 250—523 3 Claims

1. In an X-ray apparatus including a support and a mechanism for contributing to the production of an X-ray image, an improved telescopic column connecting the mechanism to the support comprising:

at least three elongated sections telescoped together in nested relationship, said sections being guided for relative telescoping movement and constructed and arranged to each move longitudinally relative to the next an equal distance when extended or retracted,

a longitudinal slot in a first of said sections that surrounds at least a second and third other section when nested,

a pulley shaft carried by said second section, extending through said slot, and a pulley on said shaft outside said first section,

a cable extending from said support to said mechanism, said cable including a loop substantially greater in length than the circumference of said pulley when said sections are nested, one portion of the loop being supported by said pulley, and

means carried by said third section securing a portion of said cable between the loop and the mechanism in fixed relationship to the third section,

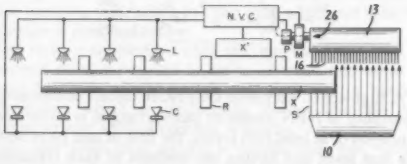
whereby the length of the cable between the pulley and said means securing cable to the third section changes at the same rate as the length of the column changes between the pulley and said securing means when the sections are moved telescopically.

4,041,321

MEASURING APPARATUS

Robert Housú Linard, 12, bis Rue de Serre, 54000 Nancy, France

Continuation-in-part of Ser. No. 594,234, July 9, 1975. This application Aug. 11, 1976, Ser. No. 713,592
Claims priority, application France, Nov. 4, 1974, 74.40629
The portion of the term of this patent subsequent to Jan. 11, 1994, has been disclaimed.
Int. Cl.[2] G01N *21/30*
U.S. Cl. 250—560 **10 Claims**



1. A device for measuring a length of an object, such as a rolled metal product, comprising;

a light emitter unit;

a light receiver unit for receiving light emited by the emitter unit, subject to imposition of a shadow on the emitted light by an object interposed between the units, the length of which object is to be measured, a length of the shadow corresponding to the length of the object and one of the units having a rotary, apertured cylindrical member and a fixed, apertured, cylindrical member having a common axis with the rotary member;

means connected with the unit having said members for rotating the rotary member to cooperate with the fixed member in providing a linearly changeable aperture for the emitted light with the shadow imposed on it to be received in the light receiver unit;

a light guiding device in the light receiver unit and extending along the common axis of said members; and

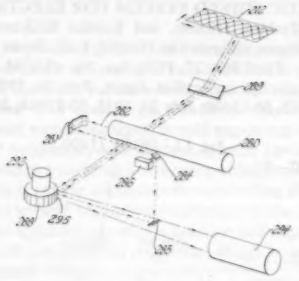
photosensitive means disposed in the light receiver unit for exposure thereof, through the light guiding device, to the received light to sense the length of the shadow and thereby to measure the length of the object.

4,041,322

APPARATUS FOR GENERATING POLYPHASE SCAN PATTERNS

Thomas D. Hayosh, Bloomfield Hills, and Anthony J. Torre, Warren, both of Mich., assignors to Schiller Industries, Inc., Troy, Mich.

Continuation-in-part of Ser. No. 466,771, May 3, 1974, abandoned. This application Oct. 28, 1975, Ser. No. 626,408
Int. Cl.[2] G06K *7/14*
U.S. Cl. 250—568 **8 Claims**



1. A scanner for producing a polyphase scan pattern of plural trace segments for use in reading bar code symbols on packages passing across a reading field adjacent a scanning window, said reading field having a horizontal axis perpendicular to the transverse axis, said scanner comprising means for producing a light beam, deflection means including an oscillating mirror in the path of said light beam, an oscillatory drive means connected with said mirror for producing a cyclically deflected beam with a vertical scanning motion component which varies as a sinusoidal function of time at a substantially constant frequency, a rotary multifaceted mirror in the path of said cyclically deflected beam, a rotary drive means connected with the multifaceted mirror for producing a scanning beam with a horizontal scanning motion component which varies periodically as a linear function of time at a substantially constant frequency, the oscillatory drive means and the rotary drive means having respective operating frequencies such that the ratio of the vertical scanning frequency to the horizontal scanning frequency is established at a nominal ratio value of $K^{+}-n/\phi$ (where K is any integer, ϕ is the number of phases of the polyphase scan pattern and n is any integer less than ϕ except that those which can be divided equally into ϕ), said deflection means thereby producing successive trace segments in the reading field with each trace segment having a sinusoidal waveform of uniform wavelength, and means for maintaining the operating frequencies at values which are at least approximately equal to the values which yields said nominal ratio value, whereby n successive trace segments will start at different vertical deflection points and the n successive trace segments will be phase displaced from the preceding trace segments by a phase angle equal to $(1^{n}-/\phi)$ (360°).

4,041,323

NON-LINEAR OPTICAL FREQUENCY DOUBLING DEVICES

Wilhelm Stürmer, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Continuation of Ser. No. 124,675, March 16, 1971, abandoned. This application Sept. 25, 1975, Ser. No. 616,679

Claims priority, application Germany, Mar. 20, 1970, 2013315

Int. Cl.[2] G02F *1/37, 1/39*

U.S. Cl. 307—88.3 **2 Claims**

1. A frequency-doubling non-linear optical device comprising a laser means producing infrared light and a crystal optically connected therewith for receiving said light and doubling the frequency thereof, said crystal being composed of a material corresponding to the formula $M[Hg(SCN)_4]$ wherein M is selected from the group consisting of Cd and Zn.

4,041,324

MAGNETIC SHIELD SYSTEM FOR ELECTRIC CARS

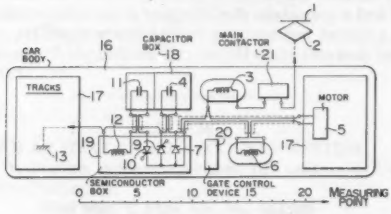
Korefumi Tashiro, Hitachi, and Kosuke Ishikawa, Fukuoka, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Jan. 27, 1976, Ser. No. 652,784

Claims priority, application Japan, Jan. 31, 1975, 50-13695; July 31, 1975, 50-93900; July 31, 1975, 50-93904; July 31, 1975, 50-93908

Int. Cl.[2] H04B *15/00*

U.S. Cl. 307—91 **7 Claims**



1. A magnetic shield system for an electric car comprising:
a car body;
a plurality of electrical devices arranged on the underside of the floor of said car body;
means including electric wires for electrically connecting said electrical devices according to their functions;
those of said electric wires through which currents of substantially the same magnitude flow in opposite directions being closely located to each other; and
tube means made of magnetic material for magneticaly shielding said those electric wires.

4,041,325

THERMOSTAT TIMER

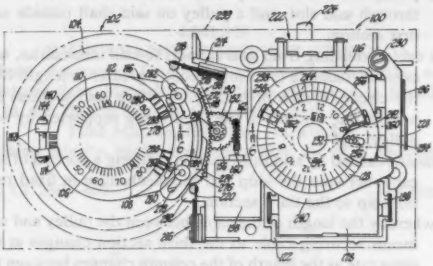
Paul G. Angott, Troy, Mich., assignor to Thermotrol Corporation, Madison Heights, Mich.

Continuation-in-part of Ser. No. 586,069, June 11, 1975, abandoned. This application Apr. 12, 1976, Ser. No. 675,719

Int. Cl.[2] F16H *5/76;* **G05D** *23/00;* **H01H** *73/10*

U.S. Cl. 307—141 **48 Claims**

1. A device for automatically adjusting the setting of a control mechanism having an externally accessible adjuster for raising and lowering the setting of the control mechanism, said device comprising: mechanically driven means for engaging and moving the adjuster of the control mechanism, drive means for driving said mechanically driven means, electrical circuit means for controlling the operation of said drive means including multiple switch means for opening and closing said electrical circuit means, timing means for controlling one of said switch means for periodically closing said electrical circuit means at predetermined times for a limited time interval to activate said drive means, and switch control means for controlling another of said switch means movable simultaneously with said mechanically driven means for opening said electrical circuit means after a predetermined amount of adjusting movement.



4,041,326

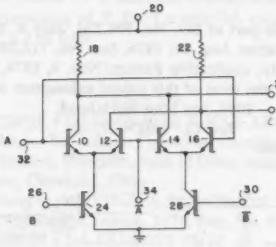
HIGH SPEED COMPLEMENTARY OUTPUT EXCLUSIVE OR/NOR CIRCUIT

Barry J. Robinson, Fremont, Calif., assignor to Fairchild Camera and Instrument Corporation, Mountain View, Calif.

Continuation-in-part of Ser. No. 704,259, July 12, 1976, abandoned. This application Feb. 22, 1977, Ser. No. 770,968

Int. Cl.[2] H03K *19/32*

U.S. Cl. 307—216 **7 Claims**



1. A high-speed exclusive OR/NOR circuit comprising:
a plurality of NPN transistor pairs arranged in a tree configuration of at least two levels, the first of said pairs being at a first level and having the emitters of each transistor in said pair being connected directly to ground reference, the collector of each transistor in said first pair being connected to the interconnected emitters of a second transistor pair and a third transistor pair in the second level;
first input signal means coupled to said first transistor pair for selectively enabling the first and disabling the second transistor in said first pair;
second input signal means coupled to said second and said third transistor pair for selectively enabling the first and disabling the second transistor in each of said second and said third pairs;
first current source circuitry including a first resistance coupled between a source of D.C. potential and a first conductor intercoupling the collector of the transistor in said second pair enabled by said second input signal means with the transistor in said third pair disabled by said second input signal means;
second current source circuitry including a second resistance coupled between said source of D.C. potential and a second conductor intercoupling the collector of the transistor in said third pair enabled by said second input signal means with the transistor in said second pair disabled by said input signal means; and

first output means coupled to said first conductor for signalling current flow from said source of D.C. potential through said first resistance and through enabled transistors to ground potential.

4,041,327

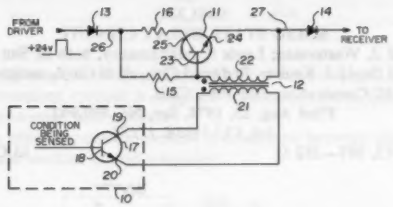
SENSE POINT CIRCUIT

Robert M. Thomas, Maitland, Canada, assignor to GTE Automatic Electric (Canada) Ltd., Brockville, Canada

Filed Aug. 2, 1976, Ser. No. 711,018

Int. Cl.[2] H03K *5/08*

U.S. Cl. 307—231 **7 Claims**



1. A sense point circuit for sensing the active or inactive condition of an electrical path as represented by the conduction or nonconduction of a solid state device, in response to an interrogating signal pulse, said sense point circuit comprising:

an input for receiving the interrogating signal pulses;

an output for providing a first current signal or relatively small magnitude in response to a received interrogating pulse indicating that the solid state device is conductive and a second current signal of relatively greater magnitude in response to a received interrogating pulse indicating that the solid state device is nonconductive;

a solid state switch having first and second sides, and a control gate, said second side being coupled to said output;

a variable impedance means coupled to said switch across said gate and said second side and to said solid state device for enabling said switch to close only when said solid state device is nonconductive;

a first resistor coupled between said input and said gate; and

a second resistor coupled in series between said input and said first side of said switch, said first resistor having a resistance which is substantially greater than the resistance of said second resistor; whereby,

when said solid state device is conductive, said variable impedance means will cause said switch to remain open upon receipt of an interrogating pulse to thereby cause the interrogating pulse to be conducted from said input to said output through said first resistor and said variable impedance means to thereby provide said first current signal and when said solid state device is nonconductive, said variable impedance means will enable said switch to close upon receipt of an interrogating pulse to thereby cause the interrogating pulse to be conducted from said input to said output through said second resistor and said switch to thereby provide said second current signal.

4,041,328

ARRANGEMENT FOR THE DETERMINATION AND VISUALIZATION OF MEASURING SIGNALS

Michael Maas, Uttenreuth, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

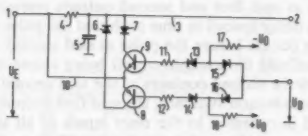
Filed Nov. 12, 1975, Ser. No. 631,395

Claims priority, application Germany, Nov. 19, 1974, 2454839

Int. Cl.[2] H03K *5/20*; A61B *5/04*

U.S. Cl. 307—351 **5 Claims**

1. In an arrangement for the determination and visualization of measuring signals having incident narrow and high-amplitudinal voltage peaks, particularly EKG signals with superimposed pacemaker impulses, including an RC-filter connected into a measuring signal path and comprising at least one ohmic resistance and at least one filter condenser; two transistors having respective conductive paths connected across the ohmic resistance, the conductive path of one of said transistors providing a path for current flow of positive polarity between an input side of the RC-filter and the filter condenser bypassing said ohmic resistance in said RC-filter in a short-circuiting mode upon the occurrence of positive voltage peaks and the conductive path of the other transistor providing a path for current flow of negative polarity between



the input side of the RC-filter and the filter condenser for bypassing said ohmic resistance in said RC-filter in a short-circuiting mode upon the occurrence of negative voltage peaks, each transistor in a conductive condition thereby directly connecting said measuring signal in said measuring signal path to said filter condenser, said transistors each having control inputs, and means providing a reference voltage connected to the control inputs of the transistors for controlling the conductive condition of said transistors responsive to the measuring signal voltage reaching respective positive and negative voltage peaks deviating from the reference voltage by a predetermined differential value.

4,041,329

MANUALLY SELECTABLE SWITCH ARRAYS

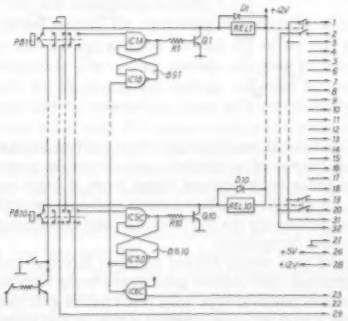
Harry Ainsworth Haskell, Ashford, England, assignor to AEP-International Ltd., Staines, England

Filed Dec. 3, 1975, Ser. No. 637,406

Claims priority, application United Kingdom, Dec. 5, 1974, 52752/74

Int. Cl.[2] H03K *17/16*

U.S. Cl. 307—247 A **2 Claims**



1. A manually actuatable selector switch assembly comprising:

a. a plurality of bistable devices each having a set input, a reset input and an output which provides a signal having a first signal potential when the bistable is in the set condition and a second signal potential when the bistable is in the reset condition,

b. a plurality of electrical switching circuits each of which has a control terminal connected to the output of a corresponding one of said bistable devices whereby said switching circuit is rendered operative in response to the pres-

ence of said first signal potential at the output of the corresponding bistable,

c. a plurality of double pole manually actuatable push button switches each having two pairs of contacts adapted to be closed upon depression of the push button, of which a first contact of one pair in each switch is connected to the set input of a different one of said bistable devices, and of which first contacts of the second said pairs in all said switches are connected in common to a source of signal potential, and

d. a monostable pulse generating circuit having an input and first and second outputs, said monostable circuit providing in response to a signal received at its input two output pulses at said first and second outputs respectively, said pulses being spaced in time such that the pulse at said first output occurs before the pulse at said second output, the input of said monostable circuit being connected in common to the second contacts of the said second pairs in all said push button switches, the said first output being connected in common to the reset inputs of all said bistable devices, and the said second output being connected in common to the second contacts of the said first pairs in all said push button switches.

4,041,330

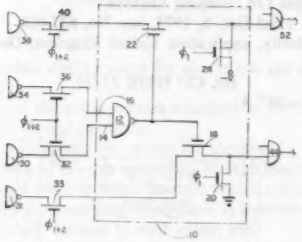
SELECTABLE EIGHT OR TWELVE DIGIT INTEGRATED CIRCUIT CALCULATOR AND CONDITIONAL GATE OUTPUT SIGNAL MODIFICATION CIRCUIT THEREFOR

John R. Spence, Villa Park, and Bruce W. Kinney, Jr., Anaheim, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Division of Ser. No. 456,997, April 1, 1974, Pat. No. 3,965,459. This application Nov. 19, 1975, Ser. No. 633,307

Int. Cl.[2] H03K *17/56, 5/13, 19/08;* **G11C** *11/21*

U.S. Cl. 307—251 **10 Claims**



1. Conditional modification means for conditionally modifying the output of a clocked gate means in response to the logical value of the output signal from at least one first-type gate, said modification being made without consuming a phase time in performing the modification, said conditional modification means comprising:

control gate means having an input terminal and an output terminal, said control gate means being responsive to said at least one first-type gate, said control gate means providing a first isolation control signal at the output terminal thereof;

conditional isolation means having an input terminal, an output terminal and a control terminal, the input terminal of said conditional isolation means connected to an output terminal of said clocked gate means the control terminal of said conditional isolation means connected to the output terminal of said control gate means, said conditional isolation means rendering said input terminal of said conditional isolation means and said output terminal of said conditional isolation means electrically connected when a first type signal is applied to said control terminal of said conditional isolation means and rendering said input terminal of said conditional isolation means and said output terminal of said conditional isolation means electrically isolated when a second type signal is applied to said control terminal of said conditional isolation means; and

output precharging means having an input terminal and an output terminal, said output terminal of said precharging means being connected to the output terminal of said conditional isolation means for precharging the output terminal of said conditional isolation means to a predetermined state, said predetermined state being the one to which the output of said clocked gate means is to be modified when the control gate means renders the conditional isolation means isolating.

4,041,331

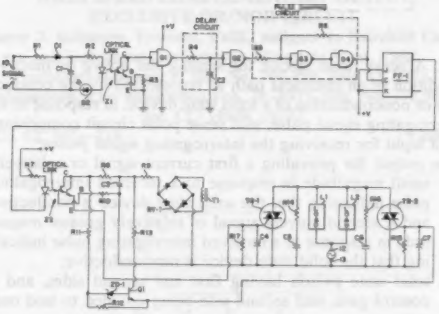
SOLID STATE RELAY CIRCUIT

David J. Westerman; Louis S. McTamaney, both of San Jose, and David J. Kauber, Redwood City, all of Calif., assignors to FMC Corporation, San Jose, Calif.

Filed Aug. 23, 1974, Ser. No. 499,942

Int. Cl.[2] H03K *17/78*

U.S. Cl. 307—252 Q **13 Claims**



1. A solid state relay circuit of the alternating impulse type comprising a thyristor having a pair of primary terminals and a gate terminal; means for connecting a load and an AC source voltage in series with said primary terminals; and a triggering circuit connected to said gate terminal for triggering the thyristor into conduction to provide a current to said load, said triggering circuit comprising means for receiving an input trigger signal, a pulse shaping circuit connected to said last named means for shaping said input trigger signal into a squared pulse, a toggle flip-flop having two output states connected to the output of said pulse shaping circuit, said flip-flop being connected to said pulse shaping circuit so as to provide alternate output states for successive input pulses, and an optically isolated switch connected between the output of said flip-flop and said gate terminal of said thyristor, said switch having a power supply separate from the power supplies for the other components in said triggering circuit.

4,041,332

SEMICONDUCTOR SWITCH DEVICE

Ichiro Ohhinata, Yokohama; Shinzi Okuhara, Fujisawa, and Michio Tokunaga, Zushi, all of Japan, assignors to Hitachi, Ltd., Japan

Filed July 25, 1975, Ser. No. 599,135

Claims priority, application Japan, July 26, 1974, 49-85151

Int. Cl.[2] H03K *17/72*

U.S. Cl. 307—252 J **11 Claims**

1. A semiconductor switch device comprising:

a PNPN switch having three PN junctions;

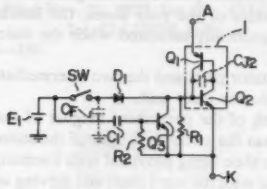
a transistor;

two impedance elements; and

a capacitive element; and wherein

one of said impedance elements is connected between the

collector and the emitter of said transistor, the collector and the emitter of said transistor being connected across one of said three PN junctions at one end of said PNPN switch, said capacitive element being connected between



the base of said transistor and a fixed potential so that only transient current is supplied to the base from the fixed potential; and wherein

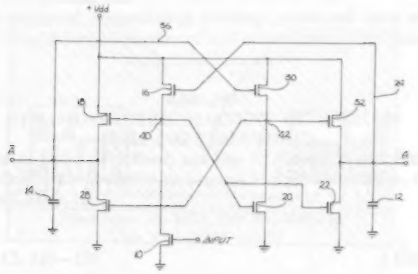
the other impedance element is connected between the base and emitter of said transistor.

4,041,333

HIGH SPEED INPUT BUFFER CIRCUIT

Eli Porat, Albany, Calif., assignor to Intel Corporation, Santa Clara, Calif.

Filed Dec. 15, 1975, Ser. No. 640,435
Int. Cl.[2] H03K *19/08, 3/26*
U.S. Cl. 307—279 **10 Claims**



1. A high speed buffer circuit having an input and true and inverted outputs for receiving an input signal and producing true and inverted output signals therefrom comprising:

an input transistor for receiving said input signal:

means coupling said input transistor to said outputs, said outputs having capacitive loads coupled thereto; and

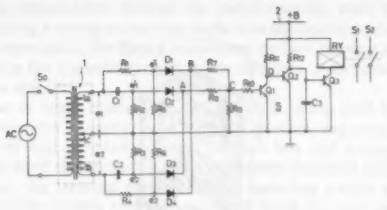
feedback means coupling said outputs to said input transistor, said feedback means being operable for shortening the response time of said true and inverted output signals at said outputs in response to said input signal at said input, and said capacitive loads being operable for delaying the effect of said output signals on said feedback means, the capacitive loads coupled to said outputs being charged in accordance with the state of said input signal being applied to said input transistor to produce said output signals at said true and inverted outputs.

4,041,334

CONTROL CIRCUIT FOR ACTUATING A DEVICE AT A DELAYED TIME WITH RESPECT TO THE TURNING ON OF A POWER SUPPLY AND FOR DEACTUATING THE DEVICE SUBSTANTIALLY SIMULTANEOUSLY WITH THE TURNING OFF OF THE POWER SUPPLY

Kaoru Umeda, Kawasaki, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Feb. 20, 1976, Ser. No. 659,689
Claims priority, application Japan, Feb. 22, 1975, 50-22135
Int. Cl.[2] H03K *5/13;* **H01H** *47/18*
U.S. Cl. 307—293 **11 Claims**



1. A control circuit comprising:

means for receiving an AC voltage;

first rectifying means coupled to said receiving means for producing a first output;

second rectifying means coupled to said receiving means for producing a second output, said first and second outputs having a predetermined phase difference therebetween;

means for combining said first and second outputs to produce a third output, said third output commencing when said AC voltage first is received and terminating when said AC voltage no longer is received;

energizing means coupled to said combining means and responsive to the commencement of said third output for producing an energizing signal at a predetermined delayed time subsequent thereto and responsive to the termination of said third output for substantially simultaneously terminating said energizing signal; and

switching means coupled to said energizing means and controlled by said energizing signal.

11. A control circuit for operating a switching device in response to the turning on and turning off of an AC power supply, comprising converting means coupled to said AC power supply for receiving the voltage supplied by said AC power supply and for converting same to a substantially constant DC level when said AC power supply is turned on and for terminating said DC level when said AC power supply is turned off, a capacitor; a DC power supply for producing a DC voltage; impedance means coupled between said DC power supply and said capacitor for supplying said DC voltage to said capacitor; a first transistor coupled to said converting means, said first transistor being conductive in response to the production of said DC level; and a second transistor coupled to said first transistor and connected to said capacitor in a discharge path therefor, said second transistor being non-conductive when said first transistor is conductive and being conductive when said first transistor is non-conductive, whereby said capacitor is charged through said impedance means when said first transistor is conductive in response to said production of said DC level so as to produce a turn-on signal at a predetermined time following the production of said DC level, and whereby said first transistor is non-conductive and said second transistor is conductive substantially simultaneously with the termination of said DC level for discharging said capacitor through said second transistor so as to substantially simultaneously terminate said turn-on signal; and a switching device supplied with and actuated by said turn-on signal.

4,041,335
PIEZOELECTRIC CERAMIC RESONATOR WITH VIBRATION DAMPING MEANS

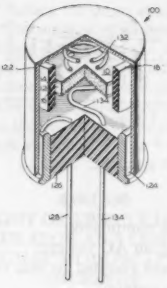
Takashi Nagata, Ikeda; Michio Ishibashi, Suita, and Yasuo Nakajima, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 58,781, July 28, 1970, abandoned, which is a continuation-in-part of Ser. No. 589,683, Oct. 26, 1966, abandoned. This application Sept. 14, 1972, Ser. No. 288,977

Claims priority, application Japan, Oct. 26, 1965, 40-66220

Int. Cl.[2] H01L *41/04*

U.S. Cl. 310—321 **4 Claims**



1. In a piezoelectric ceramic resonator including a thin flat disk of piezoelectric ceramic material which has parallel major planar surfaces and is polarized in one direction, the thickness dimension of said disk being such as to impart thereto a resonance of vibration in a thickness-shear mode at a selected frequency higher than 1MHz, operating electrodes applied to said major surfaces, and vibration damping means attached to the contour of the edge of said flat disk;

the improvement wherein the direction of polarization is at an angle of from 0° to 60° with respect to said major surfaces of the disk, and disk having a ratio of the diameter to the thickness of from 6:1 to 20:1, and said damping means is a rubber ring having a hardness from 20 to 70 on the Shore A Scale and is attached to said edge of the disk under a tension of 20–500 gr/cm.

4,041,336
SINGLE PHASE STEPPER MOTOR

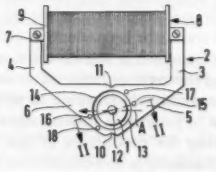
Roland Sudler, and Klaus-Dieter Hartung, both of Frankfurt, Germany, assignors to VDO Adolf Schindling AG, Frankfurt am Main, Germany

Filed Dec. 17, 1975, Ser. No. 641,561

Claims priority, application Germany, Jan. 27, 1975, 2503206

Int. Cl.[2] H02K *37/00*

U.S. Cl. 310—49 R **8 Claims**



1. A single-phase stepper motor comprising:

A. a permanent magnet rotor having a plurality of poles,

B. a stator comprising two L-shaped stator parts, each stator part being provided at one end with a pole shoe comprising main poles and auxiliary poles, the other end of each stator part having no pole shoes,

C. a bridge connecting the ends of the stator parts without pole shoes,

D. a stator winding on the bridge,

E. two intermediate parts connecting the two stator parts at opposite sides of the pole shoes, the intermediate parts being magnetically saturated when the stator winding is energized,

F. the two stator parts and the two intermediate parts forming a single one-piece unit,

G. the length of the permanent magnet of the rotor being greater than the effective length of the stator,

H. each pole shoe being provided with a semicircular recess, concentric with the rotor shaft and serving as a main pole, and

I. on at least one stator front side, a metal sheet with at least one extension protruding radially toward the rotor and beyond the recess and serving as auxiliary pole.

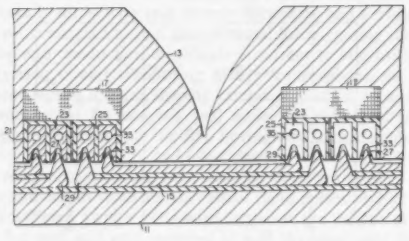
4,041,337
SEGMENTED MAGNET HOMOPOLAR DYNAMOELECTRIC MACHINES HAVING FLUID COOLED LIQUID METAL CURRENT COLLECTING ZONES

Cecil J. Mole, Monroeville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 338,489, March 6, 1973, now Defensive Publication No. T920,005. This application Aug. 19, 1975, Ser. No. 605,964

Int. Cl.[2] H02K *31/00*

U.S. Cl. 310—178 **12 Claims**



1. A homopolar dynamoelectric machine comprising:

a generally cylindrical shell of ferromagnetic material;

a generally cylindrical core of ferromagnetic material concentric with said shell, said core and said shell mounted for relative rotation therebetween;

a plurality of electrical conductors supported by said shell and spaced at intervals about the circumference thereof, said conductors being arranged in a plurality of axially displaced sets, said conductors being separated by insulation from said shell;

excitation coils located in said core to form a plurality of magnetic poles, on such magnetic pole adjacent each of said sets of conductors;

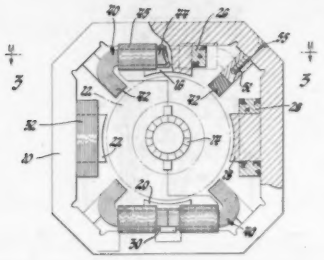
current collecting projecting rings electrically connected to the ends of said conductors; and,

means for collecting current from said current collecting projecting rings.

4,041,338
DIRECT CURRENT DYNAMOELECTRIC MACHINE COMMUTATING POLE ASSEMBLY

John E. Madsen, Lemont, and Walter Drabik, Downers Grove, both of Ill., assignors to General Motors Corporation, Detroit, Mich.

Filed Nov. 20, 1975, Ser. No. 633,826
Int. Cl.² H02K 1/10
U.S. Cl. 310—186 1 Claim



1. In a direct current dynamoelectric machine having an armature assembly including a commutator through which electrical power is supplied to the armature windings mounted for rotation within the space defined by the interior surface of a frame member and a plurality of salient field pole assemblies extending radially inwardly from the interior surface of the frame member and terminating adjacent the armature, a plurality of commutating pole assemblies for improving armature commutation, each of said commutating pole assemblies comprising:

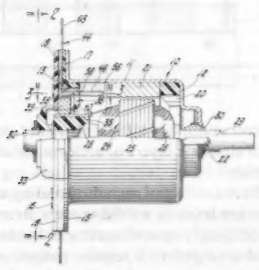
a commutating pole piece supported by said frame member made up of a plurality of laminations of a magnetic material having a first elongated portion located in the space between adjacent said field pole assemblies and extending in a direction axial to said armature and an integral second portion extending substantially normal to said elongated first portion, and

an electrical commutating winding positioned upon said integral second portion of said commutating pole piece.

4,041,339
DYNAMOELECTRIC MACHINE WITH BRUSH HOLDING STRUCTURE

David A. Huber, Trotwood, and Roy C. Schoen, West Milton, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Nov. 10, 1975, Ser. No. 630,212
Int. Cl.² H02K 13/00
U.S. Cl. 310—239 1 Claim



1. In a dynamoelectric machine having a rotor in a case with a drum shaped commutator at one end thereof, brush holding apparatus adapted for easy installation and removal of brushes and comprising:

a member forming one axial end of the case and receiving one end of the rotor rotatably therein, the member having a pair of diametrically opposed brush boxes formed therein, each brush box having a radial opening adjacent the commutator and an axial opening to the outside of the case, whereby brushes can be inserted into the brush boxes from outside the case and then biased at a right angle from the direction of insertion into engagement with the commutator;

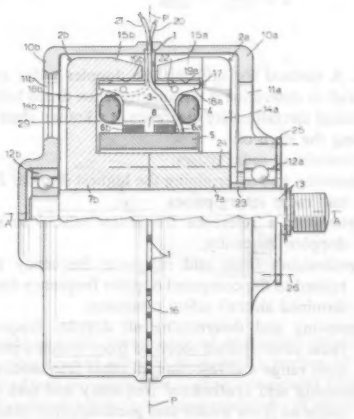
a pair of brushes, one within each brush box insertable and removable through the axial opening and engageable with the commutator through the radial opening, each brush having a spring contacting surface on the side opposite the commutator, the spring contacting surface slanting away from the commutator axis in the direction of the inside of the machine;

a pair of brush connectors, one for each brush, each brush connector comprising a terminal portion engaging the axial case member adjacent a brush box and projecting outward therefrom to define a external electrical connection, the terminal portion further including a right angle bend projecting into the associated brush box and engaging the side thereof opposite the commutator, the brush connector further including a spring member having a portion attached to the terminal portion, a first leg projecting axially into the brush box adjacent the right angle bend of the terminal portion and a second leg joined to the first leg at the end thereof opposite the connecting portion in an acute-angled apex to form a V-shaped spring between the right angle bend and the brush, the second leg engaging the spring contacting surface of the brush, the shallow slant of the spring-engaging surface transmitting a large radial component of force to bias the brush against the commutator and a smaller axial component of force to help retain the brush within the brush box.

4,041,340
BRUSHLESS ALTERNATOR

Ivan Mrcun, Kajuhova 4, Domzale, Yugoslavia (61230)

Filed Oct. 22, 1975, Ser. No. 624,933
Claims priority, application Yugoslavia, Oct. 22, 1974, 2819/74; Oct. 22, 1974, 2820/74
Int. Cl.² H02K 1/22
U.S. Cl. 310—263 10 Claims



1. In an electrical machine comprising two relatively rotatable members centered on a common axis, one of said members having a magnetically permeable body which includes a magnetized hub and two axially spaced annular arrays of pole

pieces rigid with opposite extremities of said hub, the other of said members including a set of peripherally spaced teeth interconnected by an annular yoke and positioned for magnetic interaction with said pole pieces, said yoke and said teeth being magnetically permeable, and armature windings surrounding said teeth, the pole pieces of one array having substantially axially extending faces on one side of a transverse midplane and being peripherally offset from the oppositely polarized pole pieces of the other array, the latter having substantially axially extending faces on the other side of said midplane,

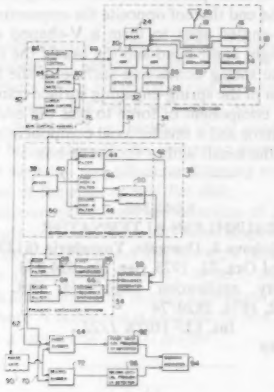
the improvement wherein said hub and said pole pieces together define an annular space surrounding said hub, said annular space being bounded in part by said axially extending faces, said teeth having major portions interconnected by said yoke in said annular space and surrounded by said armature windings.

4,041,341

DOPPLER-RADAR TERRAIN-CLEARANCE WARNING SYSTEM

Gerald E. Hart, Box 127 LOW, Locust Grove, Va. 22508

Filed May 25, 1976, Ser. No. 689,896
Int. Cl.² G01S 9/22; G01C 5/00
U.S. Cl. 343—5 R **7 Claims**



7. A method for utilizing the doppler radar system of an aircraft to determine if terrain clearance drops below a predetermined aircraft safety clearance at a known slant range comprising the steps of:

transmitting radar pulses;

receiving and determining the highest doppler frequency of said radar return pulses

generating a reference frequency related to said highest doppler frequency;

synthesizing from said reference frequency a frequency related to the computed doppler frequency for said predetermined aircraft safety clearance;

receiving and determining all doppler frequencies from radar return pulses received from within a predetermined slant range and rejecting all other frequencies;

summing said synthesized frequency and said doppler frequencies from within said predetermined slant range;

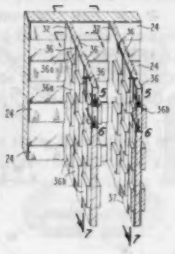
detecting if said summed frequency reaches said predetermined frequency related to said predetermined aircraft safety clearance to provide an indication if terrain clearance drops below said predetermined aircraft safety clearance.

4,041,342

ELECTRON MULTIPLIER WITH BEAM CONFINEMENT STRUCTURE

Carmen Anthony Catanese, Rocky Hill, and Scott Allen Keneman, Trenton, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Aug. 16, 1976, Ser. No. 714,358
Int. Cl.² H01J 43/18, 43/10
U.S. Cl. 313—105 R **18 Claims**



1. An electron multiplier, comprising:

at least two spaced substrates of electrically insulative material;

a cathode at one end of said substrates; and

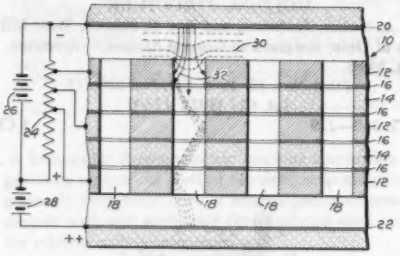
a plurality of parallel dynodes on the surfaces of said substrates which face each other, said dynodes on one of said surfaces being in staggered relation to said dynodes on the other of said surfaces with at least some of said dynodes including a nonplanar structure periodically along the length thereof, said nonplanar structure forming channels extending from said cathode and traversing said parallel dynodes and comprising confinement bumps which are adjacent to active dynode areas.

4,041,343

ELECTRON MULTIPLIER MOSAIC

Richard K. Orthuber, Sepulveda, Canada, assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed July 12, 1963, Ser. No. 294,764
Int. Cl.² H01J 43/00
U.S. Cl. 313—105 R **13 Claims**



1. An electron multiplier mosaic structure comprising:

a plurality of alternate layers of uniform metallic and insulating material;

an intermediate coating of metallic bonding material joining each adjacent layer in a solid unitary structure;

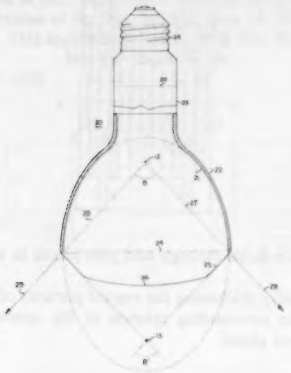
a plurality of closely spaced apertures formed through said layers and arranged in a regular pattern on the opposite ends of said structure, each said aperture forming a continuous smooth interior surface between said ends, the metallic layer portions of said surface having secondary emission characteristics.

4,041,344

ELLIPSOIDAL REFLECTOR LAMP

Frank F. LaGiusa, Cleveland Heights, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Filed Aug. 30, 1976, Ser. No. 718,525
Int. Cl.[2] H01J *5/02, 5/08;* H01K *1/32*
U.S. Cl. 313—113 6 Claims



1. An ellipsoidal reflector lamp characterized by low brightness and high illumination comprising:

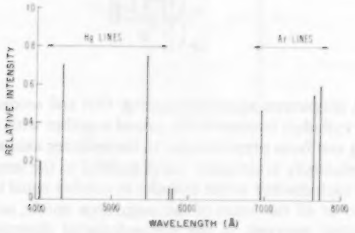
a blown glass envelope having an ellipsoidal, specular surface and a translucent face, wherein the minor diameter of the ellipsoid defines the approximate boundary between said surface and said translucent face, said ellipsoid has an eccentricity of from 0.66 to 0.88 inclusive, said face is positioned no further that $\frac{1}{4}$ *d* from the intersection of the axes of the ellipsoid, where *d* is the distance from said intersection to a focus of the ellipsoid, and wherein direct and reflected light are produced within approximately equal solid angles.

4,041,345

BLUE COLOR AC GAS DISCHARGE DISPLAY PANEL AND METHOD

Omesh Sahni, Yorktown Heights, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 31, 1975, Ser. No. 645,593
Int. Cl.[2] H01J *61/12*
U.S. Cl. 313—225 15 Claims



1. In an AC gas discharge display panel having a luminous ionizable gaseous medium therein and an open panel structure exhibiting characteristics such that said gaseous medium may periodically be driven by the drive voltage therefor to a substantially zero voltage condition thereacross, the improvement comprising an argon-based gaseous medium seeded with mercury vapor to provide a luminous gaseous medium which exhibits blue-green emission due to the efficient recombination of mercury ions during said zero voltage condition.

4,041,346

ELECTROCHEMICAL GENERATION OF FIELD DESORPTION EMITTERS

Maurice M. Bursey, Chapel Hill, N.C.; Deborah M. Hinton, Champaign, Ill.; Martin C. Sammons, Cincinnati, Ohio, and R. Mark Wightman, Lawrence, Kans., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 624,102, Oct. 22, 1975. This application May 13, 1976, Ser. No. 686,646
Int. Cl.[2] H01J *1/16, 19/10*
U.S. Cl. 313—336 2 Claims

1. A field desorption emitter comprising:

two metal rod elements;

an insulator which mechanically positions and electrically isolates the two rod elements;

a small diameter wire attached to one end of each of said elements; and

a coating of a plurality of tree-like metal dendrites electrochemically deposited using a plurality of short duration electrical pulses on said wire in a generally radially outward direction having

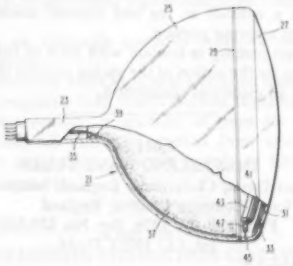
a length greater than the diameter of said wire, said metal dendrites being formed from a material selected from the group consisting of silver, nickel, cobalt, manganese, rhenium, niobium, tantalum, molybdenum and tungsten.

4,041,347

CATHODE-RAY TUBE HAVING CONDUCTIVE INTERNAL COATING EXHIBITING REDUCED GAS ABSORPTION

Samuel Broughton Deal, Lancaster, and Donald Walter Bartch, Columbia, both of Pa., assignors to RCA Corporation, New York, N.Y.

Filed Sept. 22, 1975, Ser. No. 615,681
Int. Cl.[2] H01J *29/46*
U.S. Cl. 313—450 10 Claims



1. A cathode-ray tube comprising an evacuated envelope and a conductive coating adhered to at least a portion of the interior walls of said envelope, said coating comprising carbon particles and a silicate binder consisting essentially of about 25 to 45 weight percent lithium silicate and about 75 to 55 weight percent of at least one member of the group consisting of sodium silicate and potassium silicate, said coating having a point-to-point electrical resistance of about 200 to 2,000 ohms per inch.

4,041,348

MULTI-FIGURE FLUORESCENT DISPLAY TUBE WITH ELECTRICAL LEAD-INS HAVING INNER SPRING CONTACT PORTIONS

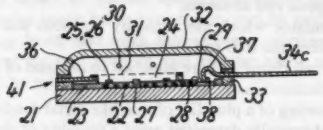
Goro Eto, and Yukihiko Utamura, both of Mobara, Japan, assignors to Futaba Denshi Kogyo K. K., Chiba, Japan

Division of Ser. No. 657,590, Feb. 12, 1976. This application Aug. 4, 1976, Ser. No. 711,577

Claims priority, application Japan, Feb. 13, 1975, 50-017476

Int. Cl.[2] H01J *1/72, 63/02*

U.S. Cl. 313—497 **1 Claim**



1. A multi-figure fluorescent display tube comprising:

an anode plate and an upper cover connected to each other through a seal portion therebetween thereby forming a casing,

the anode plate having in a laminated state a substrate made of insulating material at the bottom thereof,

a plurality of wiring films coated on the substrate,

an insulating film coated on the substrate,

a plurality of segment electrodes forming a plurality of anode display portions provided in parallel,

a fluorescent material layer provided on each of the segment electrodes,

the wiring films electrically connected respective adjacent common segment electrodes,

a plurality of conductive sections provided on the substrate with each connecting respective common segment electrodes through the wiring films,

cathodes disposed opposite to the anode display portions,

control electrodes disposed between the cathodes and the anode display portions,

lead-in wires for a cathode terminal connected to the cathodes and extended in an air-tight manner through the seal portion of the casing,

lead-in wires for a control electrode terminal connected to the control electrodes and extended in an air-tight manner through the seal portion of the casing,

a plurality of lead-in wires for the segment electrode terminal extended in an air-tight manner through the seal portion of the casing,

each of the lead-in wires for the segment electrode terminal having a contact at the end thereof inside the casing through a spring portion,

the contact coming in contact with each of the conductive sections by the action of the spring portion thereby establishing an electrical connection.

4,041,349

TRAVELLING WAVE TUBES

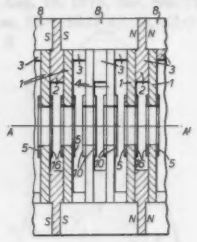
Peter Robert Davis, Chelmsford, England, assignor to English Electric Valve Company Limited, England

Filed Feb. 17, 1976, Ser. No. 658,826

Int. Cl.[2] H01J *25/34*

U.S. Cl. 315—3.5 **4 Claims**

1. A coupled cavity travelling wave tube including a stack of alternately slotted and apertured plates assembled to provide a plurality of successive coupled cavities coupled for the fundamental mode of operation; a magnetic pole piece provided at each nth cavity (where n is an integer greater than 2), which pole piece consists of an apertured plate made of ferromagnetic material and positioned between a pair of thinner slotted plates which also consist of ferromagnetic material and which have regions extending the ferromagnetic path, provided by the first mentioned apertured plate, close to the electron beam path of the tube, each pair of said thinner slotted plates being spaced apart from each other by the thickness of the first mentioned apertured plate to define a cavity between them; a periodic permenent magnetic focussing structure surrounding said stack and consisting of ring shaped magnets which provide permanent magnetic fields through said pole pieces to said electron beam path,



means axially thickening the central portions of said slotted plates in surrounding relation to the apertures of said apertured plates.

4,041,350

MAGNETRON ANODE AND A METHOD FOR MANUFACTURING THE SAME

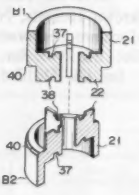
Hisao Shitara, Hiratsuka, and Takada Koosuke, Yokohama, both of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Nov. 14, 1975, Ser. No. 631,913

Claims priority, application Japan, Nov. 14, 1974, 49-131273; Oct. 7, 1975, 50-120282

Int. Cl.[2] H01J *25/587*

U.S. Cl. 315—39.75 **5 Claims**

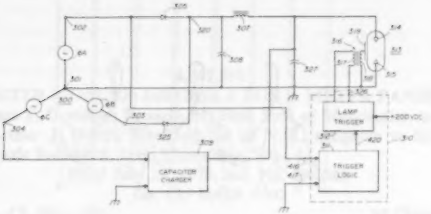


1. A magnetron anode comprising: first and second divided anode cylinders concentrically joined together with their contacting end faces perpendicular to the cylinder axis, a plurality of substantially rectangular vanes molded to the inner periphery of each divided anode cylinder in number equal to half the number of all the vanes of the magnetron anode, arranged at prescribed intervals in the circumferential direction of the divided anode cylinder, and extending in the radial direction of the divided anode cylinder from the inner periphery of the same and in the axial direction of the divided anode partly from an end thereof, and means for integrally joining together said first and second divided anode cylinders in a state wherein the vanes of one divided anode cylinder are interdigitated with those of the other divided anode cylinder and bonded to the inner periphery of the other divided anode cylinder so as to have their upper and lower edges placed in a plane perpendicular to the cylinder axis.

4,041,351
FLASH LAMP POWER SUPPLY WITH DIRECT ENERGIZATION FROM AN AC POWER SUPPLY SOURCE

David R. Whitehouse, Weston, and David W. Hartshorn, Framingham, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 470,697, May 16, 1974, abandoned, which is a division of Ser. No. 359,827, May 14, 1973, Pat. No. 3,896,396. This application Aug. 4, 1975, Ser. No. 601,908
Int. Cl.[2] H05B *41/22*
U.S. Cl. 315—205 14 Claims

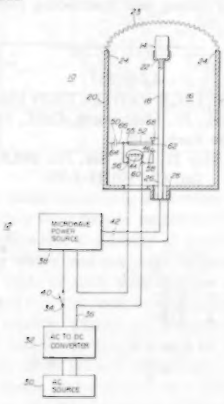


1. In combination:
uncontrolled rectifying means for coupling one or more means for producing radiation to a source of alternating power, said radiation producing means operating upon application thereto of a trigger signal, and said radiation producing means drawing the major portion of operating power directly from said alternating power source with no substantial energy storage means located therebetween; and
means for producing said trigger signal at a predetermined phase angle of said alternating power source.

4,041,352
AUTOMATIC STARTING SYSTEM FOR SOLID STATE POWERED ELECTRODELESS LAMPS

William H. McNeill, Carlisle; Paul O. Haugsjaa, Acton; Joseph Lech, Westford, and Robert J. Regan, Needham, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed July 14, 1976, Ser. No. 705,323
Int. Cl.[2] H05B *41/16, 41/24*
U.S. Cl. 315—248 5 Claims

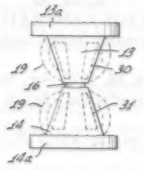


1. In an electrodeless light source having a source of power at a microwave frequency, an electrodeless lamp having an envelope made of a light-transmitting material and a volatile fill material emitting light upon breakdown and excitation and a termination fixture having an inner conductor and an outer conductor disposed around the inner conductor, the conductors having first ends associated with the lamp and second ends coupled to the source so that the microwave power terminates at the lamp to cause breakdown and excitation of the fill material, a starting control circuit comprising:
a. the source including a dc power source and a microwave power source receiving the dc power for providing microwave power in an amount related to the amount of dc power received by the dc power source, the output of the microwave power source being coupled to the inner and outer conductors,
b. switch means for controlling the application of dc power to the microwave power source,
c. a UV light source disposed near the lamp and coupled in series between the dc power source and the microwave power source to emit UV light upon actuation of the switch means to assist in starting the lamp, the UV source upon emission of light decreasing the amount of dc power coupled to the microwave power source to reduce its output as the lamp is started, and
d. means responsive to a preselected amount of heat from the UV source for providing a shunt path for the dc power to bypass the UV source and to apply maximum power to the microwave power source.

4,041,353
GLOW DISCHARGE METHOD AND APPARATUS

Alan S. Penfold, Playa del Rey, and John A. Thornton, Los Angeles, both of Calif., assignors to Telic Corporation, Santa Monica, Calif.

Continuation of Ser. No. 254,504, May 18, 1972, abandoned, and a continuation-in-part of Ser. No. 178,240, Sept. 7, 1971, Pat. No. 3,884,793. This application Dec. 23, 1974, Ser. No. 535,429
Int. Cl.[2] C23C *15/00;* H01J *17/04, 17/14;* H05R *41/24*
U.S. Cl. 315—267 56 Claims



1. A method of generating a glow discharge, comprising the steps of:
supporting an electrode assembly within a working gas environment;
applying electrical voltage to said electrode assembly; and
forming a magnetic field which defines, together with said electrode assembly, a plurality of traps for containing substantially all electrons emitted from said electrode assembly and having sufficient energy to further ionize said working gas.

4,041,354
PINCUSHION CORRECTION CIRCUIT

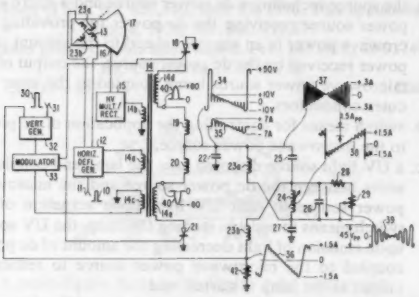
Peter Eduard Haferl, Zurich, Switzerland, assignor to RCA Corporation, New York, N.Y.

Filed Oct. 2, 1975, Ser. No. 618,842
Int. Cl.[2] H01J *29/70, 29/76*
U.S. Cl. 315—371 6 Claims

1. A pincushion correction circuit comprising:
a first capacitor;
a vertical deflection winding coupled in parallel with said capacitor;
means coupled to said first capacitor for charging said capacitor with respective decreasing and increasing amounts

of horizontal rate energy during respective first and second scan portions of each vertical deflection interval, the discharge of which capacitor providing a substantially linear vertical rate sawtooth current in said winding;

a resonant circuit tuned to approximately said horizontal



rate coupled to said means, for receiving said decreasing and increasing amounts of horizontal rate energy; and

a portion of said resonant circuit serially coupled with said vertical winding for providing a generally parabolic horizontal rate current component in said winding of such a phase as to reduce top and bottom pincushion distortion.

4,041,355

HIGH VOLTAGE GENERATING CIRCUIT

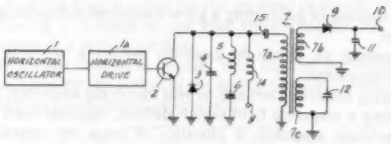
Toshio Onodera, Yokosuka, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Oct. 16, 1975, Ser. No. 623,107

Claims priority, application Japan, Oct. 21, 1974, 49-127007[U]

Int. Cl.² H01J *29/70*

U.S. Cl. 315—411 **5 Claims**



1. A high voltage generating circuit comprising:

a horizontal oscillator developing an output signal at the horizontal sweep frequency;

a flyback transformer;

means for coupling the horizontal oscillator output to the primary of said flyback transformer;

the primary and secondary windings of said flyback transformer being coupled loosely to provide substantial isolation therebetween;

circuit means causing the input resonant frequency of said flyback transformer to be in the vicinity of and higher than the frequency of said horizontal oscillator; and

said flyback transformer having a separate resonant circuit associated with its primary winding and having a resonant frequency in the vicinity of and lower than that of said horizontal oscillator.

4,041,356

AIR-BREAK CIRCUIT INTERRUPTER HAVING MAGNETICALLY-ASSISTED ARC-DIVIDING ELECTRODES

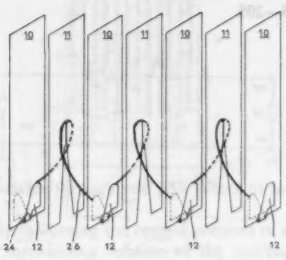
Gaston Buisson, St. Egreve, and Jacques Hennebert, Grenoble, both of France, assignors to Merlin Gerin, Grenoble, France

Filed Dec. 20, 1974, Ser. No. 535,116

Claims priority, application France, Dec. 20, 1973, 73.45892

Int. Cl.² H02H *7/22*

U.S. Cl. 361—14 **3 Claims**



1. An air-break circuit interrupter comprising:

a plurality of stacked plates of insulating material shaped to define therebetween a plurality of shallow arc-extinguishing chambers;

a plurality of electrodes straddling the lower edge of said plates, respectively, and having a generally U-shaped base portion interconnecting a pair of upwardly diverging flat arcing wings extending in said chambers in such a manner that an arc drawn below said plates transversely thereof may eventually divide into a number of elementary arcs upon contact with the lowermost part of said base portion of said electrodes, the diverging wings of adjacent electrodes extending in each chamber causing the corresponding elementary arc to develop in said chamber in an expanding loop so that the path of the current flowing in said electrodes and in said elementary arcs develops substantially in the form of an expanding helix; and

a plurality, one for each electrode, of inserts of ferromagnetic material sandwiched between the upstanding parts of said U-shaped base portion of said electrodes thereby to enhance the migratory movement of the roots of said elementary arcs attached to said electrodes from said lowermost part along said upstanding parts toward said wings.

4,041,357

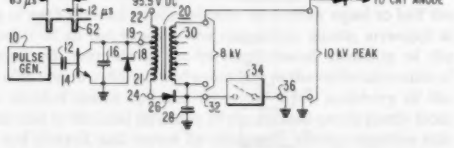
HIGH VOLTAGE PROTECTION CIRCUIT

Charles Albert Clark, Jr., Chatsworth, Calif., assignor to RCA Corporation, New York, N.Y.

Filed May 21, 1976, Ser. No. 688,587

Int. Cl.² H02H *3/00*

U.S. Cl. 361—6 **7 Claims**



1. In a high voltage power supply having high impedance output terminals across which is impressed a high voltage, the improvement for controlling the output voltage of said power supply comprising;

normally open switch means in shunting relationship with said terminals; and

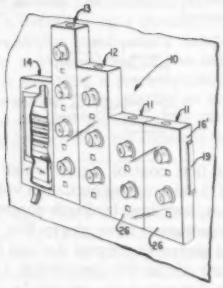
means responsive to a change beyond some given amount in an environmental parameter for closing said switch to reduce said high voltage.

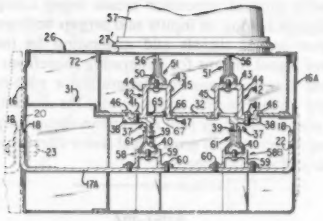
4,041,358

METER MODULE ASSEMBLY FOR A METER PANEL

James T. Donahue; Kenneth M. Hall, both of Manchester, and Arthur J. Worth, Hooksett, all of N.H., assignors to Sola Basic Industries, Inc., Milwaukee, Wis.

Filed July 23, 1975, Ser. No. 598,543
Int. Cl.[2] H02B 9/00
U.S. Cl. 361—365 18 Claims





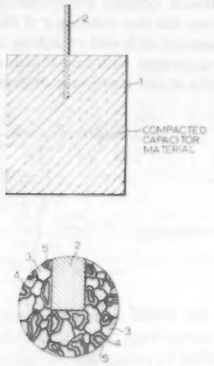
1. In a meter panel comprising a plurality of meter modules, each meter module including an enclosure having a front face opening and side walls, a plurality of parallel horizontal line buses extending within said enclosure between said side walls, means at both ends of each said line bus at said side walls interconnecting a line bus to a corresponding line bus in said adjacent meter module, a meter section removably mounted in each said front face opening, a plurality of vertical line buses within each said meter section electrically connected to said horizontal line buses, meter sockets in a forward face of each said meter section, electrical contacts within said meter sockets electrically connected to a meter mounted within each said meter socket, and electrical connecting means selectively mounted on and connected with said horizontal line buses to provide the desired phasing, said electrical connecting means holding said meter sections in place.

4,041,359

METHOD OF MAKING AN ELECTROLYTIC CAPACITOR AND ELECTROLYTIC CAPACITOR MADE THEREBY

Wataru Mizushima; Koreaki Nakata, both of Hirakata; Nobuhiro Hamasaki, Neyagawa, and Yoshio Iida, Suita, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Continuation of Ser. No. 419,965, Nov. 29, 1973, abandoned.
This application June 16, 1975, Ser. No. 586,977
Claims priority, application Japan, Dec. 6, 1972, 47-122764; Dec. 28, 1972, 48-3428; Jan. 20, 1973, 48-8860; Jan. 20, 1973, 48-8861; Jan. 20, 1973, 48-8862; Jan. 20, 1973, 48-8863
Int. Cl.[2] H01G 9/00
U.S. Cl. 361—433 12 Claims



1. An electrolytic capacitor comprising a compact unsintered body as an anode structure, said body having particles of a tantalum metal powder, each particle being composed of plural intertwined particle elements which serve as plural protruding parts protruding from the particle, and an electrically insulating lubricant-binder material selected from the group consisting of Al_2O_3, SiO_2, MgF_2, CaF_2, MoS_2, $BaSO_4$, glass, quartz and fluoro ethylene polymer, said metal powder and lubricant-binder material being compressed together to an extent sufficient to bind said particles securely to each other; a conductive wire partially embedded in said compact body and in electrical contact with some of the particles of said valve metal powder; a dielectric insulating film on the surface of the particles of said valve metal powder and the embedded part of said conductive wire, said body having interstices therein among the bound together particles, the lubricant-binder material, the embedded part of said conductive wire and said dielectric insulating film; a conductive material substantially filling said interstices and covering the outer surface of said compact body; and a further conductive material on said compact body which is in electrical contact with said conductive material.

4,041,360

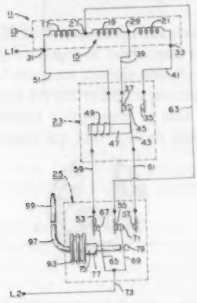
CONTROL CIRCUIT FOR AN ELECTRIC MOTOR

George E. Morris, Sterling, Ill., assignor to General Electric Company, Fort Wayne, Ind.

Filed Oct. 15, 1975, Ser. No. 622,658
Int. Cl.[2] H02P 1/44
U.S. Cl. 318—221 R 22 Claims

1. A control circuit for an electric motor operable generally at three different speeds and having three windings serially connected together in a main winding circuit with an end of one of the windings being adapted for connection with one side of a power source, the control circuit comprising a relay device including first and second contacts for connection with the winding circuit across another of the windings, switching means having a generally at-rest position in making engage-

ment with said first contact so as to render the three windings effective in the main winding circuit, a pole piece adapted to be magnetized for attracting said switching means into making engagement with said second contact so as to render the one winding and the third winding effective in the main winding circuit, and a coil associated with said pole piece for magnetizing it with said coil having one end thereof adapted for connection with the one side of the power source; and a temperature condition responsive device including a third contact connected with the other end of said coil, a first switch blade adapted for connection with the other side of the power source and having a generally at-rest position in engagement with said third contact, said pole piece being magnetized by said coil to attract said switching means into engagement with said second contact when said first switch blade is engaged with said third contact, a fourth contact for connection with the winding circuit between the one winding and the third winding, a fifth contact connected with said switching means, a second switch blade for engagement with said fourth and fifth contacts having a generally at-rest position in engagement with said fourth



contact and adapted for connection with the other side of the power source, the one winding being energized to effect operation of the motor at a first speed when said first and second switch blades are respectively engaged with said third and fourth contacts and said switching means is engaged with said second contact, and means actuated generally upon the occurrence of one preselected temperature condition for driving said second switch blade into engagement with said fifth contact when said first switch blade is engaged with said third contact to connect the one winding and the third winding across the power supply thereby to effect operation of the motor at a second speed and said driving means being further actuated upon the occurrence of another preselected temperature condition to drive said first switch blade toward disengagement from said third contact when said second switch blade is engaged with said fifth contact to connect the three windings across the power source thereby to effect operation of the motor at a third speed, said switching means returning to its generally at-rest position upon demagnetization of said pole piece when said first switch blade is disengaged from said third contact.

4,041,361

CONSTANT TORQUE INDUCTION MOTOR DRIVE SYSTEM

Edward P. Cornell, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Oct. 14, 1975, Ser. No. 621,951

Int. Cl.[2] H02K *17/02*

U.S. Cl. 318—227 **3 Claims**

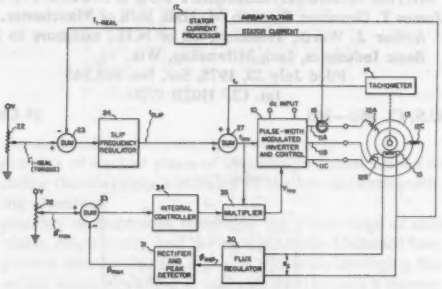
1. A constant torque induction motor control system comprising

a power converter for supplying adjustable frequency and amplitude alternating excitation voltage to a plurality of stator supply lines for connection to the stator windings of an induction motor, said motor having a stator and a rotor with an airgap therebetween,

voltage sensing means comprising a search coil for sensing the instantaneous rotor-stator airgap voltage, speed sensing means for sensing the rotor frequency, and current sensing means for sensing the instantaneous per phase stator supply line current and for respectively generating sensor signals representative thereof,

stator current processor means for deriving directly from only said airgap voltage and stator current sensor signals a sensed real stator current with respect to airgap voltage signal, and

first feedback control means responsive to the summation of a real stator current command signal and said sensed real stator current with respect to airgap voltage signal for generating a variable slip frequency signal, second feedback control means responsive to the summation of said rotor frequency sensor signal and slip frequency signal for



generating a first control signal which determines the frequency of the alternating excitation voltage supplied by said converter, and third feedback control means responsive to the summation of an airgap flux command signal and a sensed airgap flux signal derived from said airgap voltage sensor signal for generating a second control signal which determines the amplitude of the alternating excitation voltage supplied by said converter, whereby the airgap power and flux are maintained constant for selected values of said command signals,

said stator current processor means being comprised by a multiplier having as inputs said airgap voltage and stator current sensor signals and generating an instantaneous power signal, means for generating therefrom an average power signal, means for generating a root-mean-square airgap voltage signal, and a divider for dividing said average power signal by said root-mean-square airgap voltage signal to derive said sensed real stator current with respect to airgap voltage signal.

4,041,362

MOTOR CONTROL SYSTEM

Toshikazu Ichiyanagi, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 324,809, Jan. 18, 1973, abandoned, which is a continuation of Ser. No. 107,809, Jan. 19, 1971, abandoned. This application Jan. 23, 1975, Ser. No. 543,321

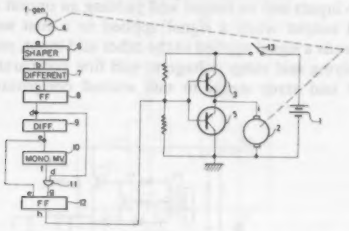
Claims priority, application Japan, Jan. 23, 1970, 45-6145; Mar. 13, 1970, 45-21686; Mar. 13, 1970, 45-21687; Apr. 3, 1970, 45-28464; Apr. 24, 1970, 45-35187; Nov. 14, 1970, 45-100611; Nov. 14, 1970, 45-100612; May 9, 1970, 45-45265[U]

Int. Cl.[2] G05B *5/00;* **H02K** *27/20;* **H02P** *5/00*

U.S. Cl. 318—318 **15 Claims**

2. A control system for driving an electric motor at a predetermined rotational speed, comprising a power source for driving the electric motor, switching means connected between the motor and the power source for applying discontinuous pulse driving currents thereto from the power source, the motor and switching means being connected in series with the

power source, tacho-generator means for producing an output corresponding to the rotational speed of the motor, analog-to-digital transforming means responsive to said tacho-generator means and coupled with said switching means for transforming an analog signal of the output of said tacho-generator means to digital signals to cause said switching means to discontinuously switch current from said power source to the motor so as to maintain the electric motor at a desired rotational speed wherein said analog-to-digital transforming means including a shaper circuit for producing square waves from said tacho-



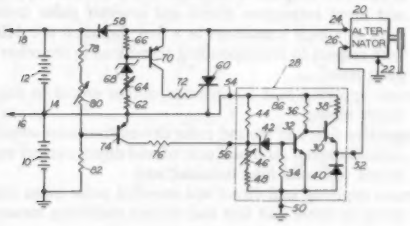
generator means, a bistable circuit responsive to the output of said shaper circuit, a monostable circuit responsive to said bistable circuit so as to be synchronized therewith and producing pulses in each cycle having a constant time period, a second bistable circuit for producing a substantially constant output when the cyclical period of the output of said first bistable circuit is less than a predetermined relation to the constant time period and for producing an asymmetrical pulse output when the cyclical period at the output of said first bistable circuit is greater than the constant time period.

4,041,363

DUAL BATTERY CHARGE CONTROL

Ralph E. Scheidler, 12712 SE. Flavel St., Portland, Oreg. 97236

Continuation of Ser. No. 477,593, June 10, 1974, abandoned.
This application Sept. 19, 1975, Ser. No. 614,850
Int. Cl.[2] H02J 7/14
U.S. Cl. 320—15 **12 Claims**



1. A charge control device for external connection between first and second series connected batteries and the single output terminal of a voltage regulated, DC output, generating means, comprising:

blocking diode means normally connecting the output terminal of the generator to that pole of the first of the batteries remote from the junction between the two so as to charge the pair of batteries in series;

latchable electrically actuable switch means, operable when actuated to establish a low resistance direct current path between the output terminal of the generating means and the junction between the first and second batteries;

electrical switch actuator means arranged for connection across the first of the batteries and responsive to a predetermined voltage drop across the first battery to actuate said switch means;

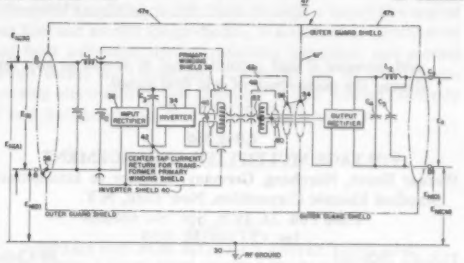
said switch means latching on after actuation to maintain said low resistance direct current path between the generating means output terminal and the junction between the batteries so as to charge only the second battery of the pair during the flow of direct current in said path and irrespective of further voltage variations in the first battery.

4,041,364

ELECTROMAGNETICALLY SHIELDED ELECTRICAL CONVERTER AND AN IMPROVED ELECTROMAGNETIC SHIELD THEREFOR

Harold A. Gauper, Jr., Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 555,425, March 5, 1975, abandoned.
This application Feb. 3, 1977, Ser. No. 654,740
Int. Cl.[2] H02M 3/22
U.S. Cl. 363—15 **49 Claims**



1. An electromagnetic interference shield for electrically enclosing a source of electromagnetic interference signals and thus substantially reducing the emanation of such signals beyond the enclosure boundary, said electromagnetic interference shield comprising:

an electrically conductive surface defining the boundary of a substantially enclosed volume for containing said source therewithin; and

an electrical center tap connection electrically connected to a first predetermined electrical reference point,

said electrical center tap connection being located at a predetermined null point on said surface where voltages induced in said surface by said electromagnetic interference signals are substantially balanced out whereby injection of such induced interference voltages to said first reference point are substantially reduced.

4,041,365

CIRCUIT FOR DETECTING A MALFUNCTION IN AN INVERTER

Steven C. Peak, and Thomas E. Anderson, both of Normal, Ill., assignors to General Electric Company, New York, N.Y.

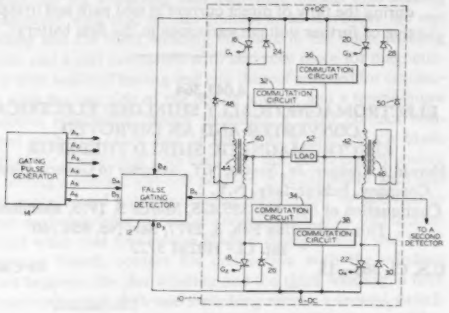
Filed Sept. 20, 1976, Ser. No. 724,803
Int. Cl.[2] H02M 1/18
U.S. Cl. 363—58 **5 Claims**

1. A circuit for detecting a malfunction in a self-commutating inverter including a series combination of at least first and second gate controlled rectifiers and a commutating interval current limiting center tapped reactor connected in series with and interposed between said rectifiers, and commutating means connected to the center tap of said reactor, said series combination being connected across a direct current source of potential, comprising:

a. means coupled to the center tap of said reactor for generating a first signal upon detecting and for the duration of an interval when both of said rectifiers are ON;

b. means, responsive to a first pulse used to initiate the interval when either of said first and second rectifiers is to be ON,, for generating a second signal having a duration greater than the normal duration of said first signal; and

c. means responsive to said first and second signals for generating a control signal to cause cessation in the operating of



said inverter if said second signal is absent at any time during the occurrence of said first signal.

4,041,366

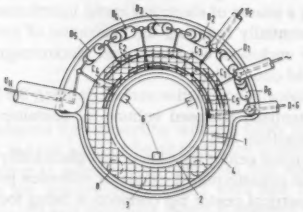
VOLTAGE MULTIPLIER ARRANGEMENT

Werner Bauer, Nurnberg, Germany, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Feb. 23, 1976, Ser. No. 660,528

Int. Cl.[2] H02M *7/10*

U.S. Cl. 363—61 **18 Claims**



1. A voltage multiplier arrangement having a multiplicity of interconnected diodes and capacitors, including input and output connections to both a.c. and d.c. terminals wherein said capacitors are formed into a tubular multiple high voltage capacitor roll and said diodes are arranged in zigzag form along the outer circumference of said roll.

4,041,367

APPARATUS FOR GENERATING ALTERNATING CURRENTS OF ACCURATELY PREDETERMINED WAVEFORM

Bernard Samuel Gold, Cheam, and Peter Alan Smithers, Crawley, both of England, assignors to Roband Electronics Limited, Horley, England

Filed Feb. 17, 1976, Ser. No. 658,742

Claims priority, application United Kingdom, Feb. 21, 1975, 7490/75

Int. Cl.[2] H02P *13/20*

U.S. Cl. 363—97 **5 Claims**

1. A circuit arrangement for providing to an electrical load an a.-c. supply of predetermined voltage waveform; said circuit arrangement comprising, in combination:

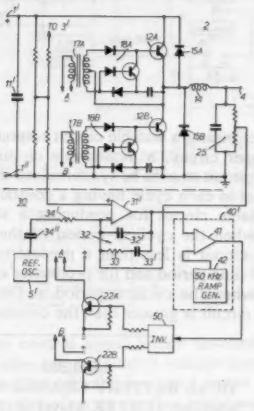
direct current supply means having positive and negative poles;

reference generator means developing reference alternating voltages of said predetermined waveform in respective phases corresponding to the number of said load terminals;

and comprising, for each said load terminal, control means comprising amplifier means having an input and an output means developing a monitor signal representative of the potential at a said load terminal, and means applying said monitor signal and a respective said reference alternating voltage in opposition to said amplifier input thereby developing at said amplifier output an error signal representing the difference between said monitor and reference signals;

ramp generator means developing a cyclically repetitive ramp voltage at a repetition rate that is a high multiple of the frequency of said reference voltages;

modulator means comprising a comparator amplifier having two inputs and an output and yielding an output signal at said output when a signal applied to a first said input exceeds a signal applied to the other said input, and means applying said ramp voltage to said first comparator input and said error signal to said second comparator input



whereby said comparator provides at its output a pulse train that is pulse-duration modulated in accordance with the magnitude of said error signal;

inverter means having an input and two outputs and yielding at said two outputs in response to a pulse train applied to said input respective direct and inverter pulse trains in each of which transitions in a first direction are delayed with respect to corresponding transitions in the other said pulse train;

means applying said comparator output signal to said inverter input;

respective first and second pulse driven transistor switching means coupled each said pole of said direct current supply means with said load terminal; and

means applying said direct and inverted pulse trains respectively to drive said first and second switching means.

4,041,368

THREE-PHASE, QUASI-SQUARE WAVE VSCF INDUCTION GENERATOR SYSTEM

David James Gritter, Elmhurst, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Jan. 2, 1976, Ser. No. 646,230

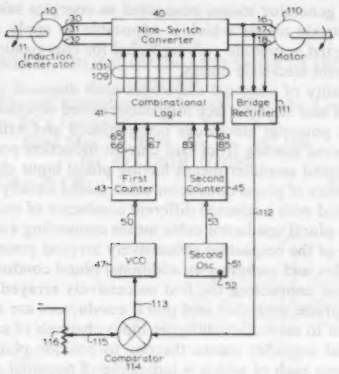
Int. Cl.[2] H02P *9/30*

U.S. Cl. 322—47 **11 Claims**

1. An ac-to-ac power conversion system having three system input connections for receiving three-phase a-c energy from an induction generator having an electric field sustained by periodic shorting of the generator terminals, and three system output connections for providing three-phase a-c energy, comprising:

a converter, comprising nine power switches connected in a matrix between the system input connections and the system output connections such that the power switches

can be closed in different combinations to effectively regulate the periodic shorting of the generator terminals and to apply different potentials to the system output connections; and



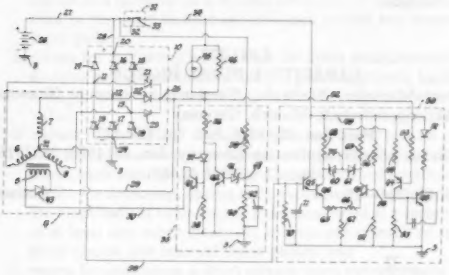
control means, coupled to the converter, for regulating turn-on and turn-off of the nine power switches to both regulate the shorting of the generator terminals and to determine the potentials applied to the system output connections.

4,041,369

STORAGE BATTERY CHARGING SYSTEM FAULT INDICATING CIRCUIT

Charles W. King; Donald O. Ruff, both of Anderson, and Leonard J. Sheldrake, Noblesville, all of Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Dec. 17, 1975, Ser. No. 641,565
Int. Cl.² H02J 7/14; H02P 9/00
U.S. Cl. 322—99 **1 Claim**



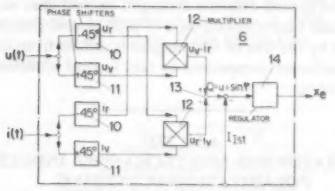
1. In a storage battery charging system of the type including a three phase alternator having alternating current output circuitry including three "wye" connected output coils and a field winding; a rectifier circuit including alternating current input circuitry interconnected with the alternator output circuitry, two separate selected polarity output terminals and a common output terminal of the opposite polarity and electrical circuitry connecting the battery to be charged and the alternator field winding across respective ones of the two separate selected polarity output terminals and the common output terminal of the rectifier circuit, a system fault indicating circuit comprising: an electrically energizable fault indicating device, a fault indicating device switching transistor having a control electrode and two current carrying electrodes connected in series with said fault indicating device across a source of energizing potential, a transistor having a control electrode connected to the one of said two separate rectifier circuit output terminals to which said alternator field winding is connected and two current carrying electrodes properly electrically poled for forward conduction therethrough; means for producing a reference potential of a predetermined direct current potential level, means including a transistor having the control electrode thereof connected to the neutral point of said "wye" connected alternator output coils for producing a sensing potential of a direct current potential level directly proportional to the direct current output potential of said rectifier circuit and, in the absence of an alternator fault, substantially equal to said reference potential, a differential amplifier circuit including a pair of transistors having first and second input terminals and first and second output terminals, means for applying said reference potential and said sensing potential each to a respective one of said differential amplifier input terminals; a first and a second Zener diode; first circuit means for connecting said first and second output terminals of said differential amplifier circuit, each through a respective one of said first and second Zener diodes, to said control electrode of said fault indicating device switching transistor; and second circuit means for connecting a selected one of said current carrying electrodes of said transistor to said control electrode of said fault indicating device switching transistor.

4,041,370

APPARATUS FOR RAPIDLY DETECTING AND CALCULATING THE ROOT MEAN SQUARE OF ELECTRICAL MEASURING VALUES IN ALTERNATING CURRENT NETWORKS

Dierk Schröder, Hohensachsen, Germany, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Oct. 1, 1975, Ser. No. 618,403
Claims priority, application Germany, Oct. 2, 1974, 2446943
Int. Cl.² H02J 3/18
U.S. Cl. 323—8 **9 Claims**

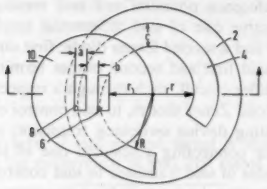


1. Apparatus for monitoring inductive reactive power within an a.c. voltage supply mains, comprising an inductive reactance component connected to said a.c. mains in parallel with a load circuit supplied by said mains, means connected in series with said reactance component for adjusting current flow therethrough, means deriving an a.c. voltage signal indicative of the voltage in said load circuit, means deriving an a.c. current signal indicative of the current flowing in said load circuit, means including phase shifting means for producing from said a.c. voltage and current signals an analog d.c. voltage proportional to the instantaneous reactive power consumption of the load and which represents the nominal value for the control, means deriving an analog d.c. signal voltage proportional to the instantaneous value of the current in the circuit containing said reactance, means comparing said analog d.c. voltages and producing a differential d.c. voltage signal, a regulator having an integral section, means connecting last said differential d.c. voltage signal to the input of said regulator, means for periodically reading the output signal from said regulator, and means connecting the periodically read output of said regulator to said means for adjusting the current flow through said reactance.

4,041,371
ARRANGEMENT FOR THE GENERATION OF ELECTRICAL SIGNALS BY MEANS OF MAGNETIC FIELD-DEPENDENT SEMICONDUCTOR COMPONENTS

Paul Hini, Barschenweg, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Apr. 30, 1975, Ser. No. 572,890
Claims priority, application Germany, May 15, 1974, 2423500
Int. Cl.[2] H01L *43/08*
U.S. Cl. 323—94 H **2 Claims**



1. An arrangement for generating electrical signals comprising:

a magnet;

first and second pole pieces each comprised of magnetically soft material and each connected to one pole of said magnet;

first and second magnetic field-dependent semiconductor components each of a first width and spaced apart a distance approximately equal to said first width connected to said first and second pole pieces, respectively;

and means arranged to influence the flux of said magnet including:

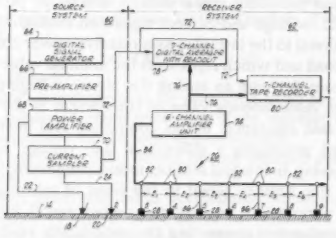
a rotatable control cam comprised of non-magentic material;

and a spiral-shaped, magnetically soft control element of a constant width approximately equal to said first width plus said spaced distance arranged on said cam such that when said cam rotates a part of said control element permeated by the flux of said magnet is shifted from said first semiconductor component to said second semiconductor component.

4,041,372
APPARATUS FOR MULTI-CHANNEL INDUCED POLARIZATION SURVEYING

Dale E. Miller; William L. Chapman, both of Ponca City, Okla.; Donald E. Dunster, Denver, Colo., and Bobby J. Thomas, Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Continuation of Ser. No. 611,503, Sept. 8, 1975, abandoned, which is a continuation of Ser. No. 324,618, Jan. 18, 1973, abandoned. This application May 25, 1976, Ser. No. 689,952
Int. Cl.[2] G01V *3/06*
U.S. Cl. 324—9 **9 Claims**



1. A system for multiple channel induced polarization geophysical surveying along a selected earth surface line of survey, comprising:

a pair of current electrode means disposed in conductive contact with said earth surface in predetermined spacing at a selected current induction point;

signal generator means connected to energize said current electrode means which is adjustable to apply thereto a selected amplitude varying signal for energization of said current electrode means;

a plurality of potential electrodes each disposed in contact with said earth surface in predetermined successive array, said potential electrodes being spaced and extending at selected spacing from said current induction point;

differential amplifier means having plural input channels;

a plurality of plural conductor cable means serially interconnected with a selected different conductor of each successive plural conductor cable means connecting a successive one of the respective successively arrayed potential electrodes, and including an additional plural conductor cable means connecting the first successively arrayed potential electrode such that said plural conductors are applied as input to respective different input channels of said differential amplifier means thereby to provide plural output signals each of which is indicative of potential difference as between a selected pair of the successively arrayed potential electrodes;

current sampling means for providing a replica signal indicative of said signal generating means amplitude varying signal;

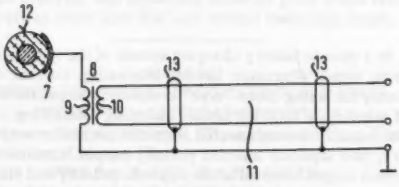
signal averaging means receiving said potential difference output signals from each respective channel of said differential amplifier means as well as receiving said replica signal output from said current sampling means, whereby each of said potential difference output signals is averaged with said replica signal over a predetermined duration to provide output of respective potential difference data values; and

means receiving each of said respective potential difference data values for generating an output display to indicate simultaneous relative potential variations representative of multiple depths along said line of survey on said earth surface.

4,041,373
CAPACITIVE PULSE PICKUP

Albert Maringer, Karlsruhe, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Jan. 20, 1976, Ser. No. 650,727
Claims priority, application Germany, Jan. 23, 1975, 2502715
Int. Cl.[2] G01R *13/42*
U.S. Cl. 324—15 **7 Claims**



1. A capacitive pulse pickup for use with an ignition cable having a conductor therein, said pickup comprising:

capacitive electrode means for placement in contact with said ignition cable so as to be subject to voltage influences other than the voltage on the conductor of said cable, said electrode means forming with the conductor of said cable a capacitor, whereby said electrode detects the voltage on said conductor;

a pulse transformer comprising primary and secondary

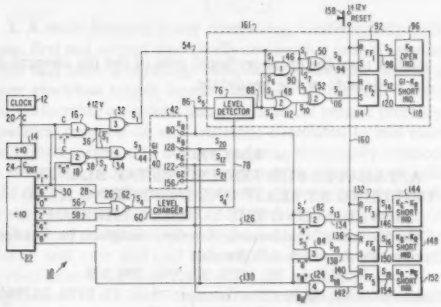
windings, said primary winding having one end directly connected to said electrode means and its other end grounded, and said secondary winding providing an output related to said voltage detected by said electrode means.

4,041,374

INTERELECTRODE OPEN AND SHORT CIRCUIT TESTER

Richard Edward Bronislaw Frankowski, Toronto, Canada, assignor to RCA Corporation, New York, N.Y.

Filed Mar. 15, 1976, Ser. No. 667,119
Int. Cl.[2] G01R *31/024*
U.S. Cl. 324—20 CR **11 Claims**



1. An apparatus for measuring open and short circuits between electrodes of an electron tube having at least two electrodes, said apparatus comprising:

a. means for applying, during an open circuit test interval, at least one input pulse to a terminal of a first electrode of said electron tube, each input pulse having a predetermined amplitude and duration;

b. means for detecting, during said open circuit test interval, the amplitude of each open circuit test output pulse produced at a terminal of a second electrode of said electron tube in response to each of said open circuit test interval input pulses;

c. means for indicating an open circuit upon measurement of an open circuit test interval output pulse amplitude having a magnitude which is less than a predetermined minimum value;

d. means for applying, during at least one short circuit test interval, at least one input pulse to a terminal of an electrode, each input pulse having a predetermined amplitude;

e. means for detecting, during each short circuit test interval, the amplitude of each output pulse produced at a terminal of at least one other electrode in response to each of said short circuit test interval input pulses; and

f. means for indicating a short circuit upon measurement of a short circuit test interval output pulse amplitude having a magnitude which exceeds a predetermined maximum value.

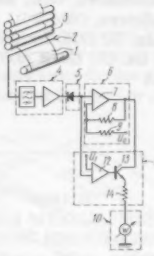
4,041,375

APPARATUS FOR MEASURING CONTENT OF MOVING DIELECTRIC MATERIALS MOISTURE

Ljudmila Alexeevna Polukhina; Vladimir Nikolaevich Polukhin, both of ulitsa Shishkova, 7, korpus 3, kv. 44, and Anna Georgievna Kochetkova, mikroraion Novye Scherbinki, 28, kv. 58, all of Gorky, U.S.S.R.

Filed Feb. 21, 1975, Ser. No. 551,680
Claims priority, application U.S.S.R., Apr. 18, 1974, 2018940
Int. Cl.[2] G01R *5/28, 31/02*
U.S. Cl. 324—32 **2 Claims**

1. An apparatus for measuring the moisture content of moving dielectric materials, comprising: an aerial provided to receive directly electromagnetic signals irradiated by discharges of static electricity occurring at each moment of time between a production apparatus and the moving dielectric material and carrying information about the moisture content of said material; a band-pass tuned filter connected to said aerial; a detector circuit connected to receive an output of said filter; an inverter connected to receive an output of said detector circuit; and a registering device connected electrically with



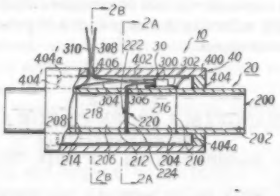
an output of said inverter circuit; a first comparator means, said first comparator means including a zero circuit connected to the output of said detector circuit; said comparator means further including a transistor triode, the base of which is connected to an output of said zero circuit; the collector of said transistor triode being connected to an output of said detector circuit and the emitter of said transistor triode being connected to said registering device.

4,041,376

DETECTOR FOR DETECTING THE STATE OF ELECTRICALLY NON-CONDUCTIVE OR SUBSTANTIALLY ELECTRICALLY NON CONDUCTIVE FLUID

Yoshio Furuto, Naka, and Masaaki Ban, Tokyo, both of Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan

Filed Mar. 27, 1974, Ser. No. 455,296
Claims priority, application Japan, Nov. 6, 1973, 48-124725
Int. Cl.[2] G01N *27/00*; G01F *1/00*
U.S. Cl. 324—33 **9 Claims**



1. A flow meter for generally electrically non-conductive liquid, comprising a transducer to generate an electrical signal responsive to the flowing state of liquid therethrough, including a radiation source to ionize said liquid and first and second ionizing areas each having a pair of electrodes exposed to said ionized liquid and defining said respective ionizing areas, said first and second ionizing areas arranged in a flowing direction of said liquid; an amplifier having a high input impedance and a low output impedance and connected to said electrodes of said first and second ionizing areas; and electrically conductive shielding means to shield said transducer and said amplifier, characterized by that said transducer further includes a conduit by which said first and second ionizing areas are enclosed and into which said liquid is introduced so that it passes through one of said first and second ionizing areas and then through the other ionizing area, and that said amplifier together with its high impedance input side is disposed within the space between said conduit and said shielding means, with

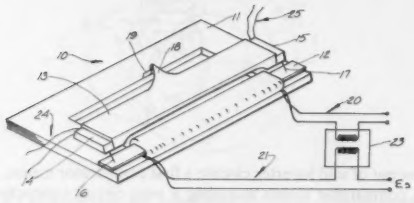
output lead means from said amplifier extending through and out of said shielding means for adaption to connection with an external circuit.

4,041,377

MAGNETOSTRICTION TESTING APPARATUS HAVING DIGITAL OUTPUT DISPLAY

Richard F. Lyke, Middletown, Ohio, assignor to Armco Steel Corporation, Middletown, Ohio

Filed Aug. 25, 1976, Ser. No. 717,631
Int. Cl.² G01R 33/12
U.S. Cl. 324—34 MA **9 Claims**



1. In a magnetostriction testing apparatus of the type having means for inducing an alternating and periodic induction in a test specimen and having at least one displacement sensitive transducer mounted in association with said test specimen for generating a magnetostriction signal representative of the magnetostrictive deformation of said test specimen in response to said induction, the improvement comprising:

a. a timing circuit in association with said means for inducing said induction for developing a plurality of timing signals, some at least of said timing signals having logical transitions corresponding to the occurrences of zero and maximum induction in said test specimen;

b. a conversion circuit responsive to said timing signals for generating from said magnetostriction signal a DC difference signal proportional to the difference between the amplitudes of said magnetostriction signal corresponding to the occurrences of maximum and zero induction in said test specimen, and

c. means responsive to said conversion circuit for producing a display reflecting the magnitude and polarity of said DC difference signal.

4,041,378

INTERCHANGEABLE PROBE TIP FOR A MAGNETIC THICKNESS GAUGE

Albert Ott, Sindelfingerstrasse 118 BRD, 7032 Sindelfingen, Germany

Filed Jan. 21, 1976, Ser. No. 650,902
Claims priority, application Germany, Dec. 13, 1975, 2556340
Int. Cl.² G01R 33/12
U.S. Cl. 324—34 TK **7 Claims**

1. An interchangeable end piece for fastening to the front surfaces of a soft-iron magnetic yoke of a measuring probe which measuring probe is used for measuring the thickness of thin non-ferromagnetic layers on a ferromagnetic base, comprising

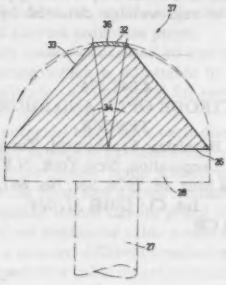
a pin element having a headplate,

a contact piece welded to the headplate which contact piece is made from a mass-produced, high-precision steel element having a contact surface with a single radius of curvature,

the radial angle of the contact surface, measured from the center of the underside of the contact piece, is much smaller than 90°,

the surface of the contact piece outside the radial angle range is depressed below the radius of curvature,

the maximum surface described by the radial angle is much



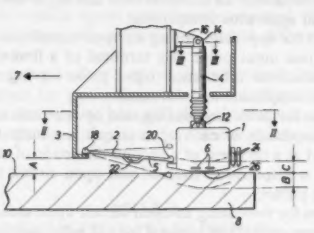
smaller than the cross-sectional area of the pin element at the underside of the headplate.

4,041,379

APPARATUS FOR TESTING METAL BLANKS UTILIZING AT LEAST ONE INSPECTING HEAD MOVED ALONG THE SURFACE THEREOF

Per-Olle Karlsson, Oxelosund, Sweden, assignor to Granges Oxelosunds Jarnverk AB, Sweden

Filed June 30, 1975, Ser. No. 591,938
Claims priority, application Germany, Aug. 19, 1974, 2439662
Int. Cl.² G01R 33/12
U.S. Cl. 324—37 **22 Claims**

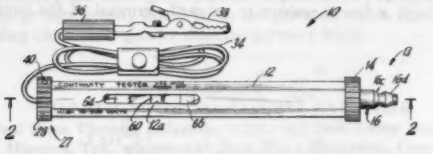


1. Apparatus for non-destructive testing of an object in the form of a metal blank, especially steel slabs, flat steel or billets for defects such as cracks, seams, cavities, bubbles or the like disposed at or near the surface of the test object, comprising inspecting means for detecting defects at or near the surface of the test object and being arranged in at least one inspection head movable in a traveling direction relative to the surface of the test object, said at least one inspecting head being supported by a support arm member and having a contact surface for contacting the surface of the test object to be scanned, first and second connecting means for connecting said at least one inspecting head to said support arm member, said first connecting means extending in a direction substantially perpendicular to the contact surface of said at least one inspecting head, said first connecting means transmitting to said inspecting head forces substantially perpendicular to said contact surface of said at least one inspecting head, and said second connecting means extending in a direction substantially parallel to said contact surface of said at least one inspecting head, said second connecting means transmitting forces to said at least one inspecting head substantially exclusively in the travel direction of said at least one inspecting head and substantially parallel to the surface of the object to be scanned and preventing lateral displacement of the inspecting head from the traveling direction.

4,041,380
MULTI-FUNCTION TESTER WITH REMOVABLE CIRCUIT CARTRIDGE

Harry Epstein, Seaford, N.Y., assignor to Kastar, Inc., Belport, N.Y.

Filed Mar. 12, 1976, Ser. No. 666,710
Int. Cl.[2] G01R 31/02, 1/06
U.S. Cl. 324—51 19 Claims

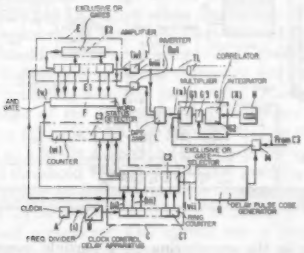


1. A multi-function tester comprising a substantially hollow case; first and second electrically conductive probes associated with said case; a cartridge removably receivable within said case; electrical circuit means contained within said cartridge for performing a predetermined number of tests; a plurality of electrical contacts on said cartridge connected to said electrical circuit means, said first probe being electrically connected to one of said contacts when said cartridge is received within said case, the number of said electrical contacts corresponding to said predetermined number of tests and being spaced from each other; and indexing means mounted for movement relative to said case and said cartridge and having a conductive portion connected to said second probe and being successively engageable with different ones of said predetermined number of electrical contacts with movement of said indexing means relative to said case and said cartridge, whereby any one of a plurality of different tests can be performed by moving said indexing means to bring different electrical contacts into engagement with said conductive portion and thereby to electrically connect different electrical contacts to said first and second probes.

4,041,381
METHODS AND EQUIPMENT FOR TESTING REFLECTION POINTS OF TRANSMISSION LINES

Lim Ching Hwa, 29 Lorong Batai, Damansara Heights, Kuala Lumpur, Malaysia

Filed Oct. 6, 1975, Ser. No. 620,194
Claims priority, application United Kingdom, Nov. 14, 1974, 49350/74; Oct. 9, 1974, 43699/74
Int. Cl.[2] G01R 31/11
U.S. Cl. 324—52 13 Claims



1. A method of locating and/or measuring the distance of a point of reflection in a transmission line and/or of measuring the level of coefficient of reflection at said point, said method comprising the steps of:

repeatedly transmitting into said line a digital word which is a predetermined number of digital bits in length, and has the property that the autocorrelation function of the digital words has an impuse function;

receiving said words after reflection back from a point of reflection;

repeatedly producing similar digital words, each word having the aforesaid number of bits in length;

delaying said similar words by a series of steps of time delay, each step occurring after a predetermined number of repetitions of said similar words;

multiplying the received reflected words by the delayed similar words;

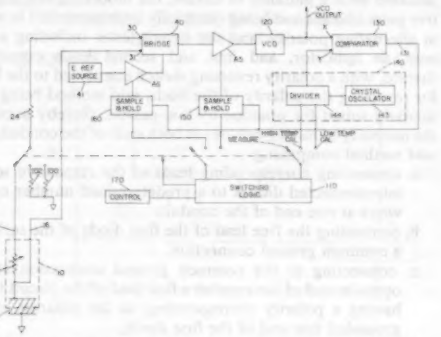
integrating the result of multiplication by an integrator; and

utilizing the peak value of the output of the integrator to determine the distance along the line of the point of reflection and/or to determine the level or coefficient of reflection at said point.

4,041,382
CALIBRATING A MEASUREMENT SYSTEM INCLUDING BRIDGE CIRCUIT

Ralph G. Washburn, Marion, Mass., assignor to The Sippican Corporation, Marian, Mass.

Filed Aug. 16, 1976, Ser. No. 714,386
Int. Cl.[2] G01R 27/02
U.S. Cl. 324—65 R 19 Claims



1. In a measurement system of the type having a sensor the electrical resistance of which varies as a function of a parameter being measured, and a bridge circuit connected to said sensor, wherein a source of a reference voltage is provided to excite said bridge to produce a bridge output indicative of the parameter being measured when said bridge is balanced, said bridge output being dependent upon the sensor resistance and said reference voltage except that said system includes circuitry for causing said output to be independent of said reference voltage at one end of a range of values of said parameter, and output circuitry is provided for converting said bridge output into a system output in accordance with an output function, that improvement comprising

first calibration circuitry connected to said output circuitry to provide a first calibration signal for calibrating said system at said one end of said range by controlling said output function,

second calibration circuitry connected to said bridge circuit to provide a second calibration signal for calibrating said system at the other end of said range by controlling the effective value of said reference voltage supplied to said bridge circuit,

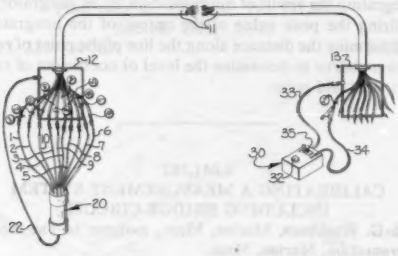
sequencing circuitry for automatically causing said first calibration circuitry to calibrate said system at said one end of said range, and then automatically causing said second calibration circuitry to calibrate said system at the other end of said range, and,

a control for activating said sequencing circuitry.

4,041,383
METHOD FOR MATCHING WIRES IN MULTIPLE WIRE CONDUITS

James Lynn Howard, Lancaster, S.C., assignor to Earl Cooper Phifer, Stanfield, N.C., a part interest

Filed Apr. 5, 1976, Ser. No. 673,660
Int. Cl.[2] G01R 31/02
U.S. Cl. 324—66 2 Claims



1. A method for matching the corresponding opposite end portions of wires located at opposite ends of a multi-wire conduit with the use of a direct current circuit tester in conjunction with a plurality of diodes, the diodes having respective pairs of leads and being electriclly interconnected in series in alternating polarity, and the circuit tester including a battery, an indicator, and first and second leads connected thereto, with a polarity reversing switch connected to the leads for reversing the polarity of the leads, said method being particularly suited for practice by one person, thereby avoiding the necessity of having persons at both ends of the conduit, and said method comprising

a. connecting corresponding leads of the respective series-interconnected diodes to a predetermined number of the wires at one end of the conduit,

b. connecting the free lead of the first diode of the series to a common ground connection,

c. connecting to the common ground connection at the opposite end of the conduit a first lead of the circuit tester having a polarity corresponding to the polarity of the grounded free end of the first diode,

d. applying the second lead of the circuit tester to the unidentified wires at said opposite end of the conduit until a wire is located which completes the circuit on the circuit tester, thus indicating a match with the wire connected to the first diode of the series at said one end of the conduit,

e. connecting the thus located wire to said first lead of the circuit tester,

f. actuating the polarity reversing switch to thereby reverse the polarity of the leads of the circuit tester,

g. applying said second lead of the circuit tester to the then remaining unidentified wires until a wire is located which completes the circuit on the circuit tester, thus indicating a match with the wire connected to the next diode of the series at said one end of the conduit, and

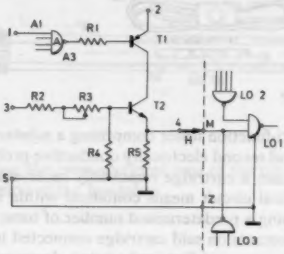
h. repeating steps (e), (f) and (g) until all of the predetermined number of wires have been identified.

4,041,384
CIRCUIT SYSTEM FOR ADJUSTING THE INPUT OF A CONNECTED-UP LOGIC CIRCUIT

Jiri Kupec, and Rehor Hrdlicka, both of Prague, Czechoslovakia, assignors to Tesla, narodni podnik, Prague, Czechoslovakia

Filed May 27, 1975, Ser. No. 580,711
Claims priority, application Czechoslovakia, Nov. 5, 1973, 7591/73
Int. Cl.[2] G01R 15/12
U.S. Cl. 324—73 PC 1 Claim

1. A test circuit system for stimulating the input of a connected-up logic circuit to the logical one level in which the inputs and/or one output of other logic circuits are connected to this input comprising a control pulse input terminal connected at least to the first input of a NAND logic circuit, the output of which is connected through a first resistor to the base of a first switching PNP transistor, the emitter of which is connected to a first positive voltage supply terminal and the collector of which is connected to the collector of a second switching NPN transistor the base of which is connected both through a fourth resistor to an earth terminal of the circuit

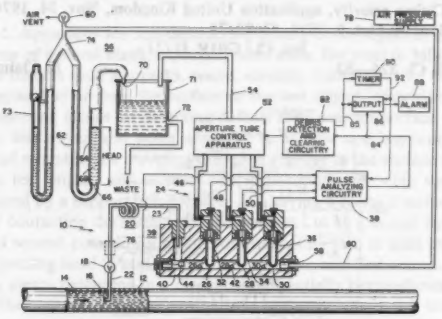


system and through a third resistor and a second resistor to a second positive voltage supply terminal and the emitter of which is connected both through a fifth resistor to the earth terminal of the circuit system and to an output terminal, means for selectively connecting said output terminal to a measuring point, means for connecting said measuring point to the input of the connected-up logic circuit, and means for simultaneously connecting said connected-up logic circuit to the earth terminal of the test circuit system.

4,041,385
ON-LINE SAMPLING SYSTEM FOR MONITORING PARTICLES SUSPENDED IN A FLUID

Henry Howard Gulliford, and Harvey John Dunstan, St. Albans, both of England, assignors to Coulter Electronics, Inc., Hialeah, Fla.

Continuation of Ser. No. 476,408, June 5, 1974, abandoned. This application Apr. 22, 1976, Ser. No. 679,219
Int. Cl.[2] G01N 27/00, 1/20
U.S. Cl. 324—71 CP 16 Claims



1. For use in the monitoring of a particle suspension, a method of regulating fluid pressure in a particle analyzing apparatus of the Coulter type and employing a sampling chamber for receiving a particle suspension from a large system of flowing fluid, subject to pressure variations said method serving to maintain approximately constant the pressure of suspension within the sampling chamber and comprising the steps of: placing in conjunction two chambers of different cross-sectional area, coupling the chamber of smaller cross-sectional area to the sampling chamber, whereby to introduce the parti-

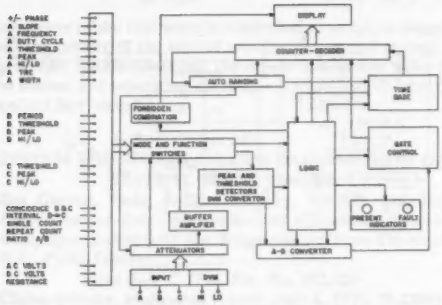
cle suspension into the smaller cross-sectional area chamber, introducing into the larger cross-sectional area chamber a liquid having a density greater than that of the particle suspension so as to maintain a pressure head of the greater density liquid within the larger cross-sectional area chamber with respect to the pressure within the sampling chamber, wherein, when the said pressure head is balanced by the suspension pressure, the liquid is retained in the larger cross-sectional area chamber, and causing the particle suspension to pass through the greater density liquid when the pressure within the sampling chamber is greater than the pressure head.

4,041,386

MULTIFUNCTIONAL CIRCUIT ANALYZER

Paul Dana Thomas, Lafayette, Calif., and Dale Leroy Burton, Houston, Tex., assignors to Data Test Corporation, Concord, Calif.

Filed May 21, 1976, Ser. No. 688,700
Int. Cl.[2] G01R *23/16*
U.S. Cl. 324—77 R **20 Claims**



1. A circuit analyzer capable of digitally measuring the duty cycle of an incoming electrical signal which comprises:

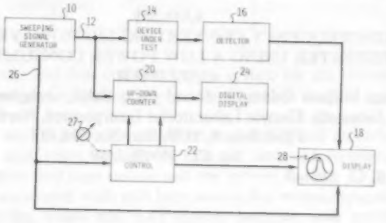
1. an input circuit means for receiving said incoming electrical signal;
2. a high threshold voltage circuit means connected to said input circuit means for providing a high threshold digital signal when the voltage of the incoming electrical signal passes through a selected high threshold voltage;
3. a low threshold voltage circuit means connected to said input circuit means for providing a low threshold digital signal when the voltage of the incoming electrical signal passes through a selected low threshold voltage;
4. a duty cycle circuit means connected to said high and said low threshold voltage circuit means for providing a first preselected DC signal when the voltage of the incoming electrical signal either (1) passes through the low or high threshold voltage to a higher voltage or (2) passes through the high or low threshold voltage to a lower voltage, and for providing a second preselected DC signal when the voltage of the incoming electrical signal subsequently either (1) passes through the high or low threshold voltage to a lower voltage or (2) passes through the low or high threshold voltage to a higher voltage;
5. an analog to digital converter means connected to said duty cycle circuit means for converting said first and second preselected DC signals into a functional digital signal proportional to the time average voltage of the first and second preselected DC signals;
6. a gate control circuit means connected to said analog to digital converter means for providing a digital start gate signal when the functional digital signal is present and a stop gate signal when the functional digital signal changes state;
7. a gate circuit means connected to said gate control circuit means for permitting a time base signal to pass through said gate circuit means when said start gate signal occurs and preventing said time base signal from passing through the gate circuit means when said stop gate signal occurs;
8. a time base circuit means connected to said gate circuit means for generating at least one time base signal of known frequency;
9. a counting circuit means connected to said gate circuit means for counting the number of cycles in the time base signal during the time interval between said start gate signal and said stop gate signal and providing a plurality of first code signals representing the total number of cycles counted;
10. a decoding circuit means connected to said counting circuit means for receiving said plurality of first code signals and providing a plurality of stable digital second code signals representing the total number of cycles counted by said counting circuit means;
11. a display means connected to said decoding means for receiving said plurality of stable digital second code signals and displaying the total number of cycles counted by a plurality of digits.

4,041,387

APPARATUS AND METHOD FOR MEASURING THE FREQUENCY OF A SWEEPING SIGNAL

Rolf W. Dalichow, and Frederic W. Woodhull, both of Santa Rosa, Calif., assignors to Hewlett-Packard Company, PaloAlto, Calif.

Filed Sept. 18, 1975, Ser. No. 614,570
Int. Cl.[2] G01R *23/02*
U.S. Cl. 324—78 R **8 Claims**



1. A method for measuring the frequency of an output signal from a sweeping signal generator at a predetermined point in the sweep of the generator, the method comprising the steps of:

receiving a start signal;

counting the number of periods of the output signal during a first time interval in response to receipt of the start signal;

stopping the counting during a second time interval subsequent to the first time interval; and

counting the number of periods of the output signal during a third time interval subsequent to the second time interval and subtracting the number of periods of the output signal counted during the third time interval from the number of periods of the output signal counted during the first time interval, thereby producing a measurement number of counts indicative of the frequency of the output signal at the time the start signal was received.

4,041,388

TRANSISTOR CIRCUIT

Hugh Arnoldi, Londondary, N.H., and Leonard Robert Salvatore, Greenbrook, N.J., assignors to RCA Corporation, New York, N.Y.

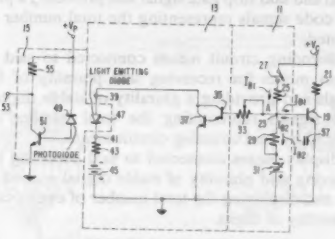
Filed Feb. 4, 1975, Ser. No. 547,020
Int. Cl.[2] G01R *31/22;* H03K *5/153*
U.S. Cl. 324—158 T **8 Claims**

1. A circuit for indicating when a bipolar transistor switches from a conducting to a nonconducting state, said transistor

having a base-emitter junction, emitter, and base electrodes, said junction exhibiting a capacitance, said circuit comprising:

means for forward biasing the base-emitter junction of the transistor, whereby said base-emitter capacitance becomes charged in a sense to forward bias the transistor, and for then removing the forward bias;

a discharge circuit including a source of reverse bias voltage



and a variable resistor connected in series between said base and emitter electrodes for providing a discharge path for said capacitance; and

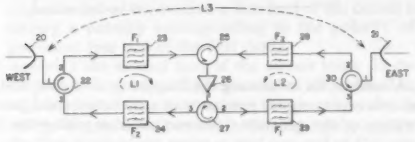
means coupled to a point in said discharge circuit, for sensing the natural decay of the voltage across said capacitance as it discharges into said discharge circuit, and for producing an output signal in response to said voltage reaching a given level.

4,041,389

NONFREQUENCY-CONVERTING MICROWAVE RADIO REPEATER USING A LOW POWER CONSUMPTION AMPLIFIER

John Willson Oades, Redwood City, Calif., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed July 9, 1975, Ser. No. 594,419
Int. Cl.[2] H04B *1/60*
U.S. Cl. 325—3 **15 Claims**



1. In an angle-modulated microwave radio system, a nonfrequency-converting microwave radio repeater providing duplex operation for angle-modulated carrier signals F_1 and F_2, where $F_1 \neq F_2$, and having nonoverlapping modulation bands ΔF_1 and ΔF_2, said repeater comprising:

first input terminal receiving said F_1 carrier and transmitting said F_2 signal;

second input terminal receiving said F_2 carrier and transmitting said F_1 carrier;

first circulator coupling means connected to said first input terminal;

second circulator coupling means connected to said second input terminal;

a first bandpass filter having a bandwidth of ΔF_1 centered at F_1 and having an input and output, said input coupled to said first circulator coupling means;

a second bandpass filter having a bandwidth of ΔF_2 centered at F_2 and having an input and output, said output coupled to said first circulator coupling means;

a third bandpass filter having a bandwidth of ΔF_1 centered at F_1 and an input and output, said output coupled to said second circulator coupling means;

a fourth bandpass filter having a bandwidth of ΔF_2 centered at F_2 and an input and output, said input coupled to said second circulator coupling means; and

third circulator coupling means operatively connected to said first filter means output and to said first filter means output;

fourth circulator coupling means operatively connected to said second filter means input and to said third filter means input;

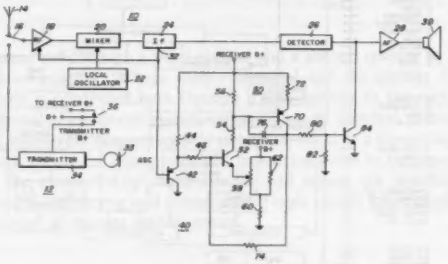
amplifier means having an input operatively connected to said third circulator coupling means and an output operatively connected to said fourth circulator coupling means, said amplifier means providing gain to at least the band of frequencies ΔF_1 and ΔF_2.

4,041,390

TRANSCEIVER SQUELCH CIRCUIT

Daniel Ray Schroeder, Lombard, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 25, 1976, Ser. No. 670,216
Int. Cl.[2] H04B *1/44*
U.S. Cl. 325—21 **8 Claims**



1. A squelch circuit adapted for use in the receiver portion of a transceiver having a switching means to select either the transmit or receive mode, the receiver including a means for providing an automatic gain control (AGC) signal, the squelch circuit comprising:

hysteresis means for unmuting the receiver at a first AGC threshold level and muting the receiver at a second AGC threshold level; and

delaying means, responsive to the switching means, for muting the receiver for a predetermined period after the transceiver has been switched from the transmit to the receive mode.

4,041,391

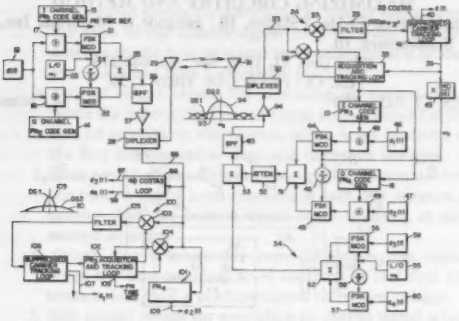
PSEUDO NOISE CODE AND DATA TRANSMISSION METHOD AND APPARATUS

Leonard F. Deerkoski, Crofton, Md., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Dec. 30, 1975, Ser. No. 645,510
Int. Cl.[2] H04L *27/10*; H04B *15/00*
U.S. Cl. 325—30 **12 Claims**

1. A method of communicating pseudo noise codes having a predetermined chipping rate and first binary data signals each having a bit rate less than an order of magnitude of the chipping rate on the same first carrier, as well as second binary data signals each having a bit rate not restricted by the chipping rate of the first carrier, from a first station to a second station, the second binary data being on a second carrier slightly displaced from the first carrier so that there is frequency overlap in transmitting the noise codes and the first and second data signals, comprising, at the first station: forming a first wave that is a suppressed carrier quadriphase digitally modulated by the pseudo noise code and the first binary data signal, the suppressed carrier of the first wave being the first carrier,

forming a second wave that is a suppressed carrier quadriphase digitally modulated by the second data, the suppressed carrier of the second wave being the second carrier, and simultaneously transmitting from the first station to the second station the first and second waves so that the effective isotropic radi-



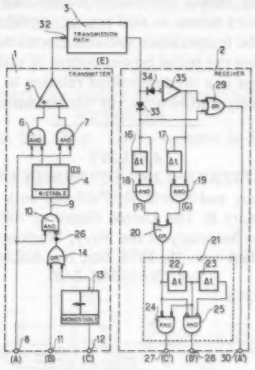
ated power of the first wave is controlled so as not to degrade the detectability of the second wave at the second station; at the second station: receiving the waves transmitted from the first station, and separating the received second wave from the received first wave.

4,041,392

SYSTEM FOR SIMULTANEOUS TRANSMISSION OF SEVERAL PULSE TRAINS

Gilles Gauriat, Paris; Jacques Vernezy, Viroflay, and Jean-Claude Barigot, Brie Comte Robert, all of France, assignors to Compagnie Industrielle des Telecommunications Cit-Alcatel S.A., Paris, France

Filed July 2, 1976, Ser. No. 702,326
Claims priority, application France, July 4, 1975, 75.21091
Int. Cl.[2] H04B *1/00*; H04L *7/00*
U.S. Cl. 325—38 A **8 Claims**



1. A system for transmitting a main pulse train at a main frequency and at least two derived pulse trains at submultiples of the main frequency, the frequencies and phase positions of the derived pulse trains being so chosen that the pulses of the derived pulse trains do not coincide, the system comprising:

a transmitter and a receiver connected by a transmission path, said transmitter including

a bipolar signal generator having an input for receiving the main pulse train and an output at which alternate pulses of the main pulse train applied at said input appear as pulses of alternate polarity, and

means for inhibiting the alternation of the polarity of the output of said bipolar signal generator, respective pulses of said at least two derived pulse trains coinciding with pulses of said main pulse train, said inhibiting means being connected to receive as inputs said at least two derived pulse trains, a first one of said derived pulse trains being applied directly to inhibit the alternation of the polarity of the output of said bipolar signal generator to create a single violation and each pulse of a second one of said derived pulse trains causing the inhibition of the alternation of the polarity of the output of said bipolar signal generator for two successive pulse periods of said main pulse train to create a double violation,

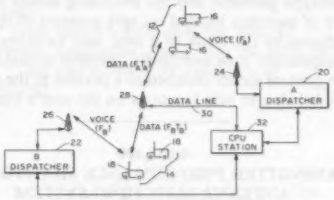
said receiver including means for detecting the single and double violations of bipolarity.

4,041,393

VEHICLE VOICE DATA LINK

Roger R. Reed, Arlington, Mass., assignor to Cadec Systems, Inc., Burlington, Mass.

Filed Feb. 14, 1975, Ser. No. 549,887
Int. Cl.[2] H04B *1/00*
U.S. Cl. 325—54 **18 Claims**



1. A voice and data communication system for use between at least one base station and a plurality of mobile stations comprising:

mobile station located means for transmitting and receiving data and voice signals on a single assigned frequency between said base station and the mobile station;

means associated with said base station for transmitting and receiving voice and data signals between said mobile station and said base station;

means associated with said base station for providing a sequence of separate time periods in a repeating interval for data transmission to corresponding ones of said plurality of mobile stations;

means for providing reception of data signals from said plurality of mobile stations intermediate the periods of data transmission in a noninterfering pattern;

means associated with each of said plurality of mobile stations for synchronizing to the pattern of data transmission and reception for said base station to identify times for data reception and transmission by that mobile station;

operator actuable means associated with at least one of said base and plurality of mobile stations for providing an indicia of operator desire for voice communication for transmission therefrom in the assigned frequency; and

means for responding to said indicia as received for initiation of voice communication during data transmission and reception on the assigned frequency.

4,041,394

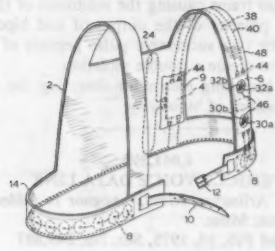
RADIO CONTROL TRANSMITTER

Ronald W. Pate, District of Algoma, Canada, assignor to River Range Developments Limited, Sault Ste. Marie, Canada

Filed July 6, 1976, Ser. No. 703,062
Int. Cl.[2] H04B *1/04*
U.S. Cl. 325—102 **11 Claims**

1. In a radio remote control transmitter assembly, comprising an antenna and a transmitter, said transmitter comprises radio frequency means connected to the antenna to supply a radio frequency signal thereto and means to modulate the radio

frequency signal supplied by the radio frequency means, said assembly further comprising switching means, a source of electrical energy, and encoder means selectively supplying any of a plurality of distinctive output signals to the modulating means in response to different conditions of said switching means, the improvement wherein the components comprised



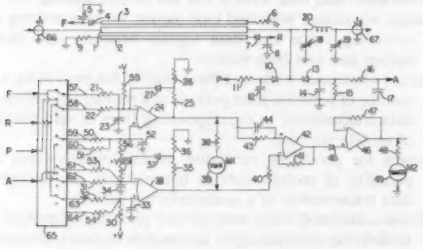
by the transmitter assembly are incorporated into the structure of a vest-type garment, and the switching means comprises a plurality of switches located on said garment at spaced locations relative by the trunk of a user, said switches being of a non-manipulatory type selectively operable to juxtaposition of a switch control means attached to a portion of the user's body movable relative to said locations on the user's trunk.

4,041,395

TRANSMITTER PERFORMANCE MONITOR AND ANTENNA MATCHING SYSTEM

John Carroll Hill, Rochester, Mich., assignor to Integral Engineering & Manufacturing Corporation, Detroit, Mich.

Filed Aug. 2, 1976, Ser. No. 710,611
Int. Cl.[2] H04B *17/00*
U.S. Cl. 325—133 **9 Claims**



1. A measurement system for output signals from radio transmitters and the like, comprising:

sensor means responsive to said output signals for producing first and second measurement signals which together define an operating characteristic of said transmitter or the like;

first and second operational amplifier means each having plural sum and difference computing input means to which said first and second measurement signals are applied, said first and second operational amplifier means also having means rendering logarithmic the outputs thereof;

means coupled across the output paths of said first and second operational amplifier means for responding to the difference between said outputs thereof and thus for providing a signal which is a logarithmic function of the ratio of two quantities, one of which quantities is related to the difference between said first and second measurement signals and the other of which quantities is related to at least one of said first and second measurement signals; and

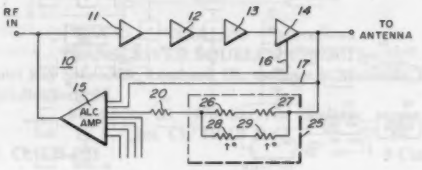
means responsive to said log function signal for providing a system output which is a measure of said operating characteristic of said transmitter or the like.

4,041,396

ENVIRONMENTALLY SENSITIVE TRANSMIT POWER MAXIMIZING CIRCUITRY AND METHOD

Chris Steven Fedde, Palatine, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 22, 1975, Ser. No. 643,215
Int. Cl.[2] H04B *1/04*; H03F *1/30*
U.S. Cl. 325—150 **4 Claims**



1. Environmentally sensitive transmit power maximizing circuitry for use in a transmitter designed for periods of extended use, said circuitry comprising:

a. power amplifying means forming a portion of the transmitter and having input, an output heat producing elements and means including a temperature dependent device for protecting said elements against high temperatures;

b. temperature sensitive means in addition to said temperature dependent device, having an electrical characteristic which varies in accordance with the temperature of said temperature sensitive means;

c. mounting means for mounting said temperature sensitive means remote from said heat producing elements and said protecting means of the transmitter and in a position to sense ambient temperatures adjacent the transmitter and

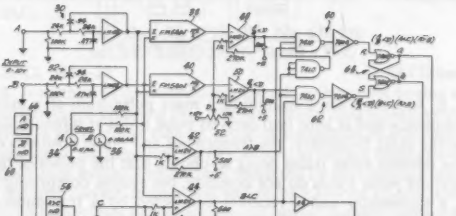
d. connecting means electrically connecting said temperature sensitive means to said power amplifying means and utilizing the temperature variable electrical characteristic for reducing the initial power output of said power amplifying means in a predetermined relation to increase in the ambient temperature adjacent the transmitter.

4,041,397

SATELLITE UP LINK DIVERSITY SWITCH

Peter W. Bauer, and Merle R. Paulson, both of San Diego, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 28, 1976, Ser. No. 680,840
Int. Cl.[2] H04B *7/20*
U.S. Cl. 325—304 **1 Claim**



1. A system for maximizing the signal received at a satellite terminal transmitted from a ground station comprising:

a. plurality of antenna means associated with said ground station for receiving a beacon signal from the satellite terminal and for transmitting signals to the satellite terminal,

b. logic circuitry for comparing the levels of said received beacon signals comprising,

1. first circuit means for providing an output signal when the ratio of the beacon signal level received at a first antenna to the beacon signal level received at a second antenna is less than a reference voltage,

2. second circuit means for providing an output signal when the ratio of the beacon signal level received at the second antenna to the beacon signal level received at the first antenna is less than said reference voltage,

3. third circuit means for providing an output signal when the beacon signal level received at said first antenna is greater than the beacon signal level received at said second antenna,

4. fourth circuit means for providing an output signal when the beacon signal level received at said first antenna is less than a predetermined reference voltage,

5. fifth circuit means for providing an output signal when the beacon signal level received at said second antenna is less than said predetermined reference voltage,

first AND gate circuit means having a first input coupled to said first circuit means, a second input coupled to said third circuit means and a third input coupled to said fourth circuit means for providing a high output switching signal when signals are present at all three inputs simultaneously,

second AND gate circuit means having a first input coupled to said second circuit means, a second imput coupled to said third circuit means and a third input coupled to said fifth circuit means for providing a second high output switching signal when signals are present at all three inputs simultaneously,

c. an RF transmitter;

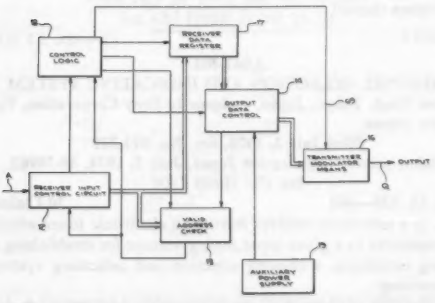
d. an RF switch coupled to said RF transmitter, said plurality of antenna means, and to said logic circuitry and being responsive to the output switching signal for connecting the RF transmitter to the antenna means receiving the strongest beacon signal.

4,041,398

BI-DIRECTIONAL DIGITAL COMMUNICATION NETWORK

Michael L. Ellis, San Diego, Calif., assignor to ICC, Inc., San Diego, Calif.

Filed June 3, 1976, Ser. No. 692,487
Int. Cl.² H04B *1/46*
U.S. Cl. 325—308 **22 Claims**



1. A low frequency bidirectional digital communication unit for use over coaxial cables of the cable TV system type, for requesting the performance of services by transmitting data to a central computer comprising:

address byte register means for registering an address codeword associated with said unit,

modem control code register means for registering a data word corresponding to services requested by said unit,

shift register means coupled to said address byte register means and said modem control code register means for receiving the contents of said address byte register means and the contents of said modem control code register means in parallel and for shifting said address codeword and said data word out of said data shift register serially to provide a serial output to the central computer on the coaxial cable, and

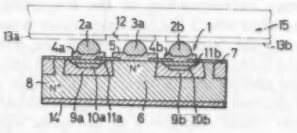
transmitter modulator means coupled to the serial output of said shift register means for transmitting said serial output of said shift register means to said central computer on a low frequency carrier wave to request the performance of services.

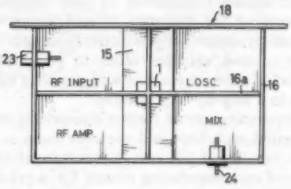
4,041,399

SEMICONDUCTOR VARACTOR DEVICE AND ELECTRONIC TUNER USING SAME

Yukio Tsuda, Machida, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed May 17, 1976, Ser. No. 686,782
Claims priority, application Japan, May 20, 1975, 50-59859
Int. Cl.² H04B *1/08;* H01L *29/93*
U.S. Cl. 325—357 **15 Claims**





1. A varactor device, comprising:

plural varactor elements each including first and second semiconductor regions of opposite conductivities in a semiconductor body, said first and second regions defining a PN junction therebetween, any two of said varactor elements being separated from each other by semiconductor material of one conductivity type and being electrically isolated from each other;

electrode means on said semiconductor material of one conductivity type;

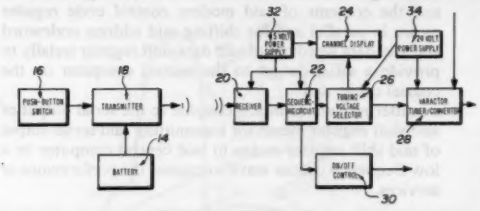
plural electrodes on said plural varactor elements, respectively, each said electrode being in contact with said first semiconductor region; and

individual conducting means on said electrode means and on said plural electrodes, respectively, said individual conducting means being arranged on a substantially common surface of said varactor device, and any two of said conducting means on said electrodes being separated from each other by said conducting means on said electrode means.

4,041,400
TELEVISION REMOTE CONTROL SYSTEM

Gary P. Watts, Schaumburg, Ill., assignor to Sperry Electronics Ltd., Melrose Park, Ill.

Filed Feb. 23, 1976, Ser. No. 660,648
Int. Cl.[2] H04B 1/16
U.S. Cl. 325—392 10 Claims



1. Apparatus adapted to be retro-fitted to a television for electronically controlling the selecting of channels and the ON/OFF functions thereof, the television including a tuner, the television's tuner being tuned to a predetermined unused channel and the television being turned ON, comprising, in combination:

a hand control comprising transmitter means operable to transmit a sonic signal;

a control unit comprising:

a varactor tuner;

converter means coupled to said varactor tuner for converting the output signals thereof to signals having the frequency corresponding to the frequency of the unused channel to which the television tuner is tuned, said signals having the frequency to which the television tuner is tuned being coupled to the television tuner;

channel display means operated to provide an indication of the channel to which said varactor turner is tuned;

receiver means responsive to said sonic signals transmitted by said transmitter means;

circuit means comprising a tuning voltage selector circuit for selectively coupling tuning voltages to said varactor tuner to tune the same to the respective ones of said plurality of different channels, and a sequencing circuit operated responsive to the receipt by said receiver means of said sonic signals transmitted by said transmitter means for controlling the operation of said tuning voltage selector circuit to sequentially selectively couple the tuning voltages to said varactor tuner to progressively tune said varactor tuner to each of said plurality of different channels in a step-by-step fashion;

said sequencing circuit further comprising time delay means operated each time said varactor tuner is tuned to one of said plurality of different channels to inhibit further operation of said sequencing circuit for a pre-established time interval whereby a pause is provided after the varactor tuner is tuned to a channel before the varactor tuner is tuned to the next channel; and

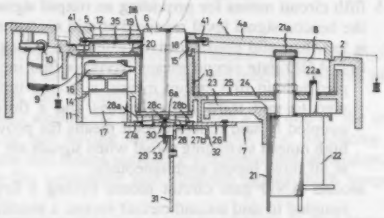
a manually operable channel selector switch means for operating said circuit means, whereby the television can be both remotely and manually selectively tuned to a channel by operating the transmitter means and the channel selector switch means.

4,041,401
CHANNEL INDICATING APPARATUS

Nobuo Kitamura, Sagamihara; Katsuo Takada, and Hiroshi Fukagawa, both of Yokohama, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed July 1, 1975, Ser. No. 592,212
Claims priority, application Japan, July 12, 1974, 49-82527[U]
Int. Cl.[2] H04B 1/06
U.S. Cl. 325—455 3 Claims

1. A channel selecting and indicating apparatus for a television receiver having a cabinet provided with a control panel, said apparatus cooperating with tuner means included in said television receiver to enable an operator to preset said tuner means to selected, predetermined channels and to subsequently select any one of said preset channels, comprising: a predetermined number of channel indicating locations on said control panel; a plurality of individually adjustable variable resistors mounted in said control panel, each said variable resistors being associated with a corresponding one of said channel indicating locations and accessible by said operator to preset said tuner means to a desired one of said channels; a plurality of manually operable channel selecting switches, each switch being associated with a corresponding one of said channel indicating locations and mounted on said control panel to be selectively manually operated for tuning said tuner means to the one channel preset by said variable resistor associated with said one channel indicating location; a plurality of illuminating means disposed at said channel indicating locations, each being energized when an associated channel selecting switch at said channel indicating location is operated; a moveable cover



mounted over said control panel, said moveable cover having a front side and a reverse side; a plurality of channel indicating tabs mounted on the reverse side of said moveable cover, each of said tabs being mounted at a position on said cover such that when said cover is closed over said control panel, each of said tabs is positioned over a corresponding one of said illuminating means, each of said tabs having portions of differing light transmissivity to define a channel numeral, whereby the particular channel numeral defined by the corresponding channel indicating tab is illuminated when the associated channel selecting switch at said channel indicating location is operated to energize its associated illuminating means; and a plurality of manually operable band change-over switches separate from and independent of said channel indicating tabs, each of said band change-over switches being associated with a corresponding channel indicating location and a corresponding one of said variable resistors for selecting the desired frequency band of operation of said tuner means in response to a manual activation thereof.

4,041,402
CHANNEL SELECTION AND INDICATING SYSTEM

Takao Mogi, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed July 1, 1975, Ser. No. 592,339
Claims priority, application Japan, July 5, 1974, 49-76962
Int. Cl.[2] H04B 1/06
U.S. Cl. 325—465 10 Claims

1. In a television receiver having an electronic tuner which is responsive to a given input tuning voltage for establishing a tuning condition, a channel selection and indicating system comprising:

a plurality of channel selection means for producing respective input tuning voltages,

each of said channel selection means having a switch connected in circuit therewith,

means responsive to the operation of one of said switches for

coupling a tuning voltage from a predetermined one of said channel selection means to said electronic tuner,

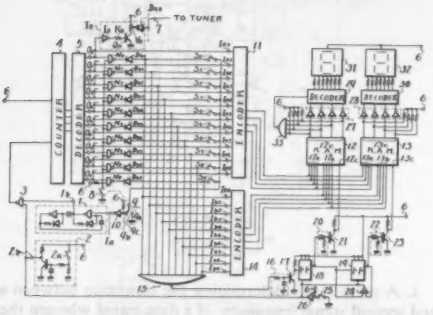
a memory means having address terminals, data terminals and output terminals,

address signal generating means coupled between said channel selection means and said address terminals of said memory means,

data signal generating means coupled in circuit between said switches and said data terminals of said memory means,

channel indicating means coupled in circuit with the output terminals of said memory means,

mode switching means for causing said switches to have in one mode the function of channel selection and in another mode the function of providing a path for programming



the output of said memory thereby to yield a given channel number for a given address of said memory,

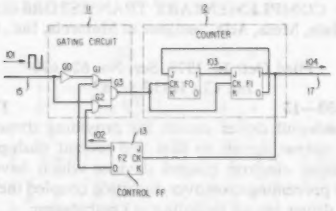
said channel selecting means comprising a pulse generating means, a counter connected to said pulse generating means, a decoder connected to said counter, and tuning voltage generating means connected to said decoder, each one of said switches being in circuit with said pulse generating means and respective outputs of the decoder such that a respective signal output of the decoder is coupled through said respective switches to operate the pulse generating means and such that the pulse generating means ceases to operate when the output of the decoder acquires a predetermined state as a result of the count of said counter.

4,041,403

DIVIDE-BY-N/2 FREQUENCY DIVISION ARRANGEMENT

Richard Samuel Chiapparoli, Jr., Freehold, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed July 28, 1975, Ser. No. 599,341
Int. Cl.[2] H03K *21/00, 23/08*
U.S. Cl. 328—39 **3 Claims**



1. A frequency divider circuit for deriving two output pulses for every N input pulses where N is an odd number comprising:

a source of pulses,

gating means having two operating states and either of said states to the other thereof, a third input connected to said source and an output terminal for reproducing said input pulses at said output terminal in one of said states and for inverting said input pulses at said output terminal in the other of said states,

synchronous counter means having an input connected to said gating means output terminal and selectively operated in response to a receipt of each group of $(N+1)/2$ of said reproduced and of said inverted input pulses from said output terminal for producing an output pulse, said counter means including,

a plurality of J-K flip-flops each having a J data input, a K data input, a clock input and logic outputs,

means for interconnecting particular ones of said data inputs and said outputs of said plurality of flip-flops, and

means connecting said clock inputs of each of said flip-flops in parallel to said gating means output terminal for changing the state of individual ones of said flip-flops in response to a receipt of a pulse from said gating means output terminal synchronously to increment a pulse count, and

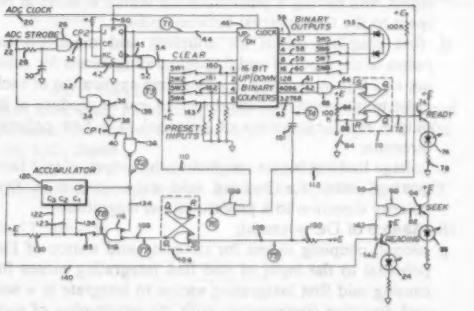
toggle switch means having outputs connected selectively to actuate one of said pair of inputs of said gating means and an input responsive to a receipt of said counter means output pulse for effecting a toggling of said switch means to switch the state of said gating means and for effecting the inverting of said pulses at said gating means output terminal to yield two equally spaced output pulses upon the receipt of two of said groups of $(N+1)/2$ pulses at said output terminal.

4,041,404

APPARATUS AND METHOD FOR DETECTING WHEN A MEASURED VARIABLE REPRESENTED BY A STRING OF DIGITAL PULSES REACHES A PLATEAU

Ronald Cyril Lewis, Jr., Willow Grove, Pa., assignor to Leeds & Northrup Company, North Wales, Pa.

Filed June 1, 1976, Ser. No. 691,687
Int. Cl.[2] H03K *5/153, 5/18*
U.S. Cl. 328—150 **6 Claims**



1. Apparatus for detecting when the value of a measured variable has reached a plateau when that value is represented by periodically produced strings of pulses having pulse counts representative of the value, comprising;

a first counting means operable to count consecutive pairs of said pulse strings so that the consecutive counts are in opposite directions,

a second counting means, and

means responsive to the output of said first counting means at the end of each pair of pulse strings and operable to increment said second counting means when the count accumulated by said first counting means at the end of the second string of said pair is within a predetermined number of counts of the count existing before counting the first string of the pair and to clear said second counting means when the count is not within the predetermined number, whereby the accumulation of a predetermined number of

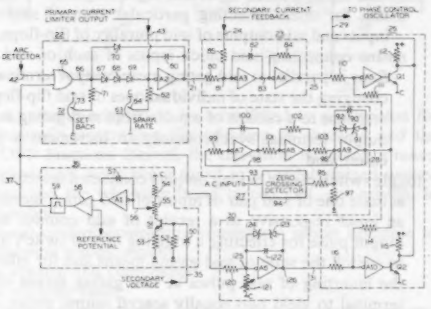
counts in said second counter is indicative of said measured variable reaching a plateau.

4,041,405

SAWTOOTH WAVEFORM GENERATOR

Richard Kent Davis, Salem, Va., assignor to General Electric Company, New York, N.Y.

Filed Aug. 13, 1976, Ser. No. 714,152
Int. Cl.² H03K *4/10*
U.S. Cl. 328—181 **5 Claims**



1. A sawtooth waveform generator adapted to provide a train of sawtooth waveform signal having equal bi-polar excursions of predetermined amplitude and of frequency accurately related to the frequency of an AC input signal, comprising:

a. first integrating means comprising an input, and an output adapted to supply said train of sawtooth waveform signal;

b. a source of AC signal;

c. pulse generating means responsive to said AC signal for producing unidirectional pulses having a predetermined frequency relationship with the frequency of said AC signal, and having a pulse duration which is short in respect to the time interval between pulses;

d. first coupling means for coupling said unidirectional pulses to the input of said first integrating means for causing said first integrating means during application of each pulse to integrate in a first direction and to produce at its output rapid excursions of potential in a first polarity direction;

e. voltage limiting means coupled to the output of said integrating means for limiting said excursions in a first polarity direction to a predetermined magnitude;

f. a source of DC potential;

g. second coupling means for coupling said source of DC potential to the input of said first integrating means for causing said first integrating means to integrate in a second direction commencing with the termination of each pulse and terminating with the initiation of a subsequent pulse, and to produce at its output gradual excursions of potential in a second polarity direction;

h. second integrating means having a long RC time constant in respect to the frequency of said unidirectional pulses and comprising an input and and output;

i. means for coupling the sawtooth waveformsignal produced by said first integrating means to the input of said second integrating means to produce at the output of said second integrating means an error signal constituting a time integral of amplitude differences between the bi-polar excursions of said sawtooth waveform; and

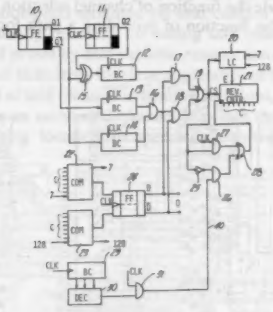
j. means for coupling said error signal from the output of said second integrating means to the input of said first integrating means in a manner to reduce said amplitude differences so as to provide a sawtooth waveform signal having equal bi-polar excursions of predetermined amplitude.

4,041,406

METHOD AND APPARATUS FOR THE DETERMINATION OF THE TRANSITION OF DIGITAL DATA SIGNALS MODULATED WITH TWO DIFFERENT SIGNAL FREQUENCIES

Lorenz Hanewinkel, Paderborn, Germany, assignor to Nixdorf Computer AG, Paderborn, Germany

Filed July 1, 1976, Ser. No. 701,567
Claims priority, application Germany, July 3, 1975, 2529784
Int. Cl.² H03K *9/06*; H04L *27/14*
U.S. Cl. 329—107 **23 Claims**



1. A method for determining the transition between a first and second signal frequency of a data signal wherein the data signal is modulated with different signal frequencies, comprising the steps of:

generating a comparison pulse of a first or second duration at each pulse front of said data signal during said second or first signal frequency, respectively,

generating a control pulse at the leading edge of each comparison pulse,

terminating the control pulse at the trailing edge of each comparison pulse,

changing the contents of a storage means in a first direction during said control pulses,

changing the contents of said storage means in a direction opposite from said first direction during the intervals between said control pulses, and

establishing a pair of separated threshold values whereby the attainment of one of said threshold values by said contents of storage means is interpreted as a transition of the data signal from one signal frequency to the other signal frequency, which transition is also used for the change over of the duration of the comparison pulses.

4,041,407

DRIVER CIRCUIT FOR DEVELOPING QUIESCENT AND DYNAMIC OPERATING SIGNALS FOR COMPLEMENTARY TRANSISTORS

W. Eric Main, Mesa, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Filed Oct. 22, 1975, Ser. No. 624,690
Int. Cl.² H03F *3/183*
U.S. Cl. 330—13 **17 Claims**

1. A push-pull driver circuit for providing dynamic and quiescent output signals to first and second push-pull connected output electron control devices which have a bias circuit for preventing crossover distortion coupled thereto, the push-pull driver circuit including in combination:

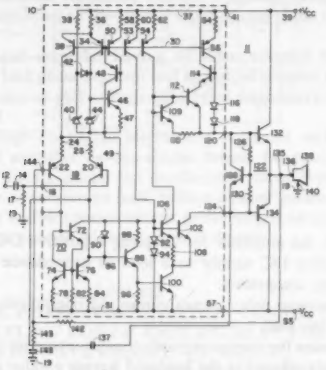
first current supply means for providing a substantially constant current at an output terminal thereof;

first driver transistor means for amplifying a dynamic driving signal and having first, second, and control electrodes, said control electrode being coupled to said output terminal of said first current supply means, said first electrode

being adapted to be coupled to both the control electrode of the first push-pull connected electron control device, and to the bias circuit;

first bias means for enabling said first driver transistor means to have a high gain and for controlling the magnitude of the quiescent current provided by said first driver transistor means to the first push-pull connected electron control device, said first bias means being coupled between said control and first electrodes of said first driver transistor means;

second driver transistor means for amplifying a dynamic driving signal and having first, second and control electrodes, said second electrode of said second driver transistor means being adapted to be coupled to both the control



electrode of the second push-pull connected electron control device and to the bias circuit; and

second bias means coupled to said second driver transistor means for enabling said second driver transistor means to have a high gain and for controlling the magnitude of the quiescent current provided by said second driver transistor means to the second push-pull connected electron control device; and

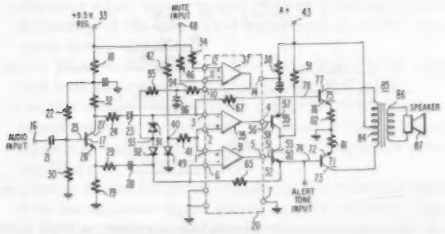
driver circuit means for dynamically driving said first and second driver transistor means, said driver circuit means being coupled between said output terminal of said first current supply means and said control electrodes of said first driver transistor means and said second driver transistor means.

4,041,408

PUSH-PULL AUDIO AMPLIFIER SYSTEM WITH MUTING

Vincent William Trotnick, Jr., West Newton, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Nov. 12, 1976, Ser. No. 741,510
Int. Cl.² H03F *3/26*
U.S. Cl. 330—15 **4 Claims**



1. In an audio amplifying system including a pair of amplifiers connected in push-pull for driving a loud speaker coil, the combination therewith for amplifying and muting the speaker comprising:

a pair of current-differencing operational amplifiers characterized by inverting and non-inverting current responsive inputs to provide an output voltage proportional to the difference in the input currents, each of said operational amplifiers having a feedback circuit including a resistor coupled between the output and inverting input,

means for coupling a first of said operational amplifiers to a first of said amplifiers connected in push-pull and for coupling the second of said operational amplifiers to the second of said amplifiers connected in push-pull,

means for biasing said operational amplifiers to provide in the quiescent state a DC output voltage therefrom of a value sufficient to equally forward bias the first and second amplifiers connected in push-pull and to provide with the value of said feedback resistors substantially equal currents to the inverting and non-inverting inputs of said operational amplifiers whereby said operational amplifiers are biased into the linear region,

phase splitter means having one output coupled to the inverting input of said first operational amplifier and having a second output terminal coupled to the inverting input of said second operational amplifier and being responsive to audio signals at the input for providing first power divided audio signals of a first phase and magnitude to the inverting input of said first operational amplifier and for providing second power divided audio signal of equal magnitude and 180° out-of-phase with said first power divided signal to the inverting input of said second operational amplifier whereby the first and second power divided audio signals are amplified and applied separately to said first and second amplifiers connected in push-pull, and

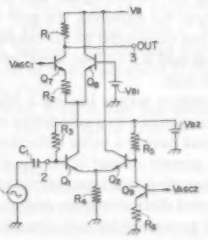
muting means responsive to a squelching signal for simultaneously applying sufficient DC current to the inverting input terminals of both current differencing operational amplifiers to decrease the DC output level therefrom to a muting level below the forward bias level of said first and second amplifiers connected in push-pull to simultaneously bias said first and second amplifiers off and mute the speaker.

4,041,409

AUTOMATIC GAIN CONTROL CIRCUIT

Yasuo Kominami, Kokubunji; Yukio Suzuki, Hirai Hinode, and Masami Kawamura, Kodaira, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Oct. 6, 1976, Ser. No. 729,984
Claims priority, application Japan, Oct. 8, 1975, 50-120673
Int. Cl.² H03G *3/30*
U.S. Cl. 330—29 **9 Claims**



1. An automatic gain control circuit comprising:

a first pair of transistors whose emitters are commonly coupled to one end of common impedance means, the other end of said common impedance means being connected to a reference potential source;

a second pair of transistors whose emitters are commonly

coupled to a collector of one of said first pair of transistors, the collector of the other of said first pair of transistors being connected to a source of operating potential;

load impedance means for coupling the collector of one of said second pair of transistors to said source of operating potential, the collector of the other of said second pair of transistors being directly connected to said source of operating potential;

means for applying an input signal to said one of said first pair of transistors; and

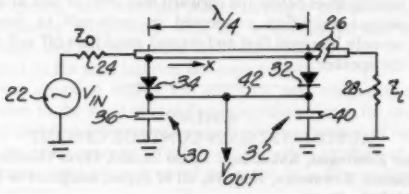
means for supplying a gain control signal to the base of either transistor in each pair of said first pair of transistors and said second pair of transistors so as to increase the collector bias current of said one of said first pair of transistors and conversely decrease the collector bias current of said one of said second pair of transistors in response to an increase of said input signal.

4,041,410

RF LEVEL DETECTOR

Donald Keith Belcher, Melbourne, Fla., assignor to Harris Corporation, Cleveland, Ohio

Filed Apr. 12, 1976, Ser. No. 675,761
Int. Cl.[2] H03G *3/20*
U.S. Cl. 330—129 **6 Claims**



1. Apparatus for feedback stabilizing an RF amplifier and comprising:

a variable gain RF amplifier responsive to an input signal for providing an RF output signal, and further responsive to a control input for adjusting the gain of said amplifier;

a trasmission line connected to the output of said RF amplifier such that said RF output signal propagates along said transmission line;

amplitude detection means having a plurality of input circuits each responsive to a respective input signal for providing a signal having a value reflective of the peak amplitude of the greater of said input signals;

means for connecting said input circuits to said transmission line at selected distances from one another whereby said peak signal generated by said detection means reflects a signal amplitude corresponding to at least the amplitude produced when said transmission line is terminated in a matched impedance, and responsive to changing VSWR; and,

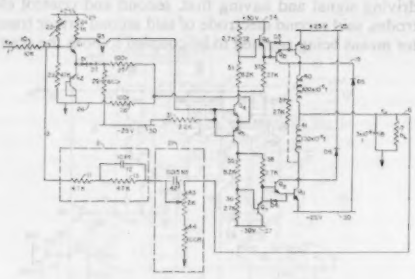
means for supplying said peak signal to said control input of said RF amplifier so as to control the gain of said amplifier in accordance therewith and thereby feedback stabilize said amplifier.

4,041,411

QUANTIZED AMPLIFIER

Clayton L. Sturgeon, Fort Worth, Tex., assignor to Ranger Engineering Corporation, Fort Worth, Tex.

Continuation-in-part of Ser. No. 508,767, Sept. 24, 1974, abandoned, which is a continuation-in-part of Ser. No. 340,682, March 13, 1973, abandoned. This application Mar. 1, 1976, Ser. No. 662,871
Int. Cl.[2] H03F *21/00*
U.S. Cl. 330—207 A **17 Claims**



13. An amplifier for coupling a positive DC supply and a negative DC supply to a load in accordance with an input signal, comprising:

response delay means connected operatively in series with the load,

means for comparing only the instantaneous output signal as developed at the load and having a value proportional to an input signal with the input signal and generating an error signal, and

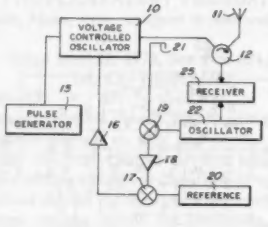
a transistorized two state circuit responsive only to the polarity of the error signal for completing and maintaining an interconnection between one of the DC sources and said response delay means and for maintaining an open connection between the other of the DC sources and said response delay means until the polarity of the error signal reverses and interchanging said interconnection between the DC sources and said response delay means in response to a reversal of error signal polarity.

4,041,412

HIGH POWER, PULSED MICROWAVE FREQUENCY CONVERTER

Hugh Robert Malone, Phoenix, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed June 14, 1976, Ser. No. 695,698
Int. Cl.[2] H03B *3/04*
U.S. Cl. 331—10 **5 Claims**



1. In a microwave communications system, a high power, pulsed microwave frequency converter comprising:

a. a voltage controlled microwave oscillator having a bias input, a control input and an output, and supplying micro-

wave frequency signals at the output only when a proper bias is applied to the bias input thereof;

b. bias pulse generating means providing periodic pulses of bias power connected to the bias input of said voltage controlled microwave oscillator each of said bias pulses having a duration of less than approximately 250 nanoseconds;

c. a mixer having a first input coupled to the output of said voltage controlled microwave oscillator, a second input and an output;

d. local oscillator means having an output connected to the second input of said mixer;

e. a phase detector having a first input coupled to the output of said mixer, a second input and an output;

f. an intermediate frequency reference source having an output connected to the second input of said phase detector;

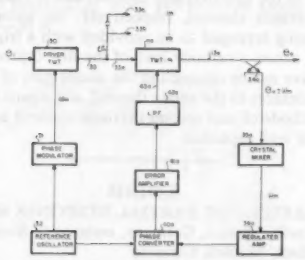
g. a wideband amplifier having an input coupled to the output of said phase detector and an output coupled to the control input of said voltage controlled microwave oscillator; and

h. said voltage controlled microwave oscillator and said wideband amplifier having means therein for providing sufficient tuning range and bandwidth, respectively, to cause the converter to lock onto a desired microwave frequency within a period shorter in duration than approximately ten percent of the bias pulse duration.

4,041,413
AUTOMATIC PHASE COMPENSATION CIRCUIT FOR PARALLELING POWER AMPLIFIERS IN THE MICROWAVE FREQUENCY RANGE

Claude Strothers, Jr., 30742 Tarapaca Road, Rancho Palos Verdes, Calif. 90274

Filed Jan. 2, 1976, Ser. No. 646,279
Int. Cl.² H03F *3/58*
U.S. Cl. 330—43 **7 Claims**



1. An automatic phase control microwave amplifier system employing a plurality of microwave power amplifiers;

means applying a microwave signal to be amplified in parallel to the power amplifiers;

a reference signal source having a lower frequency than the frequency of the microwave signal applied to the microwave power amplifiers;

means phase modulating the microwave signal to be amplified with the output of the reference signal source;

respective means coupled to the output of each microwave power amplifier for detecting the phase of the modulation frequency content of the output of the respective power amplifiers;

respective means for phase comparing the reference signal from its reference signal source and the reference signal detected at the output of its respective microwave power amplifier;

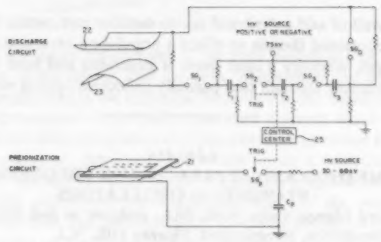
respective means developing an error signal proportional to the phase error between the reference signal and the reference signal as detected at the output of the microwave power amplifier; and

means applying respective the error signals to each respective microwave power amplifier as a phase correction signal.

4,041,414
MULTIPLE ARC RADIATION PREIONIZER FOR GAS LASERS

Martin C. Richardson, and Kurt Leopold, both of Ottawa, Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Filed Mar. 21, 1974, Ser. No. 453,517
Claims priority, application Canada, May 30, 1973, 172712
Int. Cl.² H01S *3/097*
U.S. Cl. 331—94.5 G **4 Claims**



1. A multiple arc radiation preionizer for gas lasers of the type having two main electrodes defining a main laser discharge region between them comprising:

a. a sheet of dielectric material,

b. an elongated metallic conductor positioned over the surface of the sheet,

c. said conductor having formed over a portion of its length a series of gaps to form a series of intervening discharge electrodes and thus an overall linear array of arc gap positions,

d. said conductor having end connections such that on connection to a high voltage source, simultaneous arcs producing ultra violet radiation are formed between said discharge electrodes over the surface of the dielectric sheet, and

e. a metal conductor positioned on said sheet in spaced relation to said electrodes to form a low inductance ground plane, said conductor being connected to one of said end connections or to ground.

4,041,415
COAXIAL ELECTRON BEAM PUMPED LASER

Earl R. Ault, Rolling Hills Estates; Philip C. Stevens, Redondo Beach; Robert H. Sipman, Agoura, and Robert S. Bradford, Jr., Los Angeles, all of Calif., assignors to Northrop Corporation, Los Angeles, Calif.

Filed May 7, 1976, Ser. No. 684,456
Int. Cl.² H01S *3/097*
U.S. Cl. 331—94.5 PE **6 Claims**

1. A laser comprising:

a hollow cylindrical cathode member fabricated of an electrically conductive material,

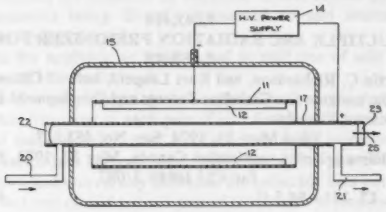
a hollow cylindrical anode member having a smaller diameter than said cathode member and being mounted in internal concentricity therewith,

means for feeding a lasing gas to within the chamber formed by said cylindrical anode member, said anode member being sealed at the opposite ends thereof to contain said gas,

optical reflector means positioned at the opposite ends of said cylindrical anode member for forming a laser oscilla-

tor cavity, one of said optical means being only partially reflective, and

high voltage means connected between said anode and cathode members to generate an e-beam which penetrates the



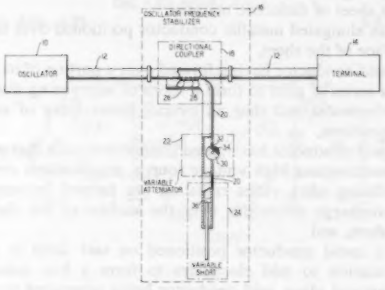
wall of said cylindrical anode member and excites the gas contained therein to effect a population inversion in said gas, whereby a laser beam is generated and laser energy emitted through said partially reflective optical means.

4,041,416

METHOD AND APPARATUS FOR FREQUENCY STABILIZING OSCILLATORS

Bernard Glance, Colts Neck, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 22, 1976, Ser. No. 734,718
Int. Cl.[2] H03B *3/06*
U.S. Cl. 331—96 **4 Claims**



1. A method of stabilizing the frequency of an oscillator comprising the steps of:

a. tapping a fraction of the output signal from the oscillator propagating in a main transmission line into a second waveguide transmission line section having a coefficient of thermal expansion per degree Centigrade (/° C) which is greater than the coefficient of relative frequency drift/° C of the oscillator, said oscillator output signal including frequency deviations due to the effect of ambient temperature variations on the oscillator;

b. attenuating the tapped signal propagating in said second waveguide transmission line section by a predetermined amount;

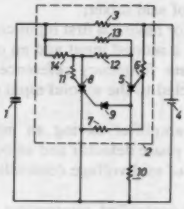
c. reflecting the attenuated signal back along said second waveguide transmission line section towards said oscillator, said second waveguide transmission line section elements functioning in response to ambient temperature variations to produce reactive load variations having a corresponding magnitude and an opposite sign to impedance changes in the oscillator caused by said ambient temperature variations which, in turn, produce said frequency deviations therein.

4,041,417

LOW DUTY CYCLE PULSE GENERATOR USING TWO THYRISTORS

Arne Goran Gabrielsson, Vallingby, and Jan Erik Lindstrom, Spanga, both of Sweden, assignors to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed May 27, 1976, Ser. No. 690,421
Claims priority, application Sweden, June 19, 1975, 7507127
Int. Cl.[2] H03K *3/35*
U.S. Cl. 331—107 R **2 Claims**



1. A pulse generator with a low duty factor comprising a power supply, a capacitor having a pair of terminals connected across said power supply and arranged to alternately be charged via a first current path including a charging resistance means and discharged via a second current path, the second current path comprising a first thyristor element having its anode-cathode circuit connected across the capacitor and being arranged to be activated by a predetermined capacitor voltage and to be deactivated by a second thyristor element, means connected across said power supply for maintaining the anode gate of said first thyristor element at a predetermined fraction of the voltage of the power supply, a resistor network comprising a first resistor means connected between the anodes of the thyristor elements and second and third resistor means arranged to connect a first terminal of the capacitor to the anode of the first thyristor element and to the anode of the second thyristor element, respectively, the second thyristor element being arranged to be provided with a trigger voltage generated across a cathode load of the first thyristor element, low resistive means connecting the anode gate of said second thyristor element to the anode thereof, and means for connecting the cathode of said second thyristor element to the second terminal of said capacitor.

4,041,418

EQUALIZER FOR PARTIAL RESPONSE SIGNALS

Helmut Koeth, Munich, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Continuation-in-part of Ser. No. 431,433, Jan. 7, 1974, abandoned. This application June 24, 1975, Ser. No. 589,930
Claims priority, application Germany, Jan. 5, 1973, 2300454
Int. Cl.[2] H04B *3/04*
U.S. Cl. 333—18 **4 Claims**

1. An equalizer for partial-response signals having data detection means for receiving input data signals and transforming same into signals of predetermined discrete amplitudes and error means for producing error signals indicative of the differences between said input signal amplitudes and said discrete amplitudes, comprising:

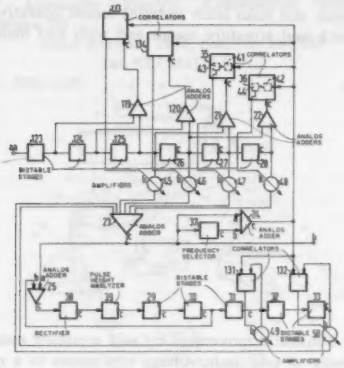
first shift register means comprising a plurality of bistable stages forming a transversal filter,

a plurality of adjustable gain amplifier means, each having an input connected to an output of a different one of said bistable stages of said first shift register means, said amplifiers being coupled to said error means so that said error signals control the gains thereof,

first analog adder means having inputs connected to outputs of said plurality of adjustable gain amplifier means,

second shift register means having a plurality of bistable stages and

second analog adder means having an input connected to an output of said first analog adder and another input connected to the output of a predetermined one of the stages



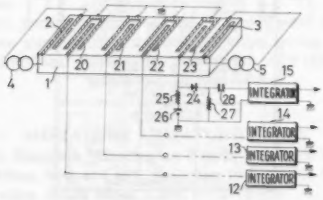
of said second shift register means and having an output coupled to an input of the first stage of said second shift register means.

4,041,419

SURFACE ELASTIC WAVE ANALOGUE CORRELATOR

Bernard Desormiere; Olivier Menager; Albert Courty, and Grégoire Eumurian, all of Paris, France, assignors to Thomson-CSF, Paris, France

Filed July 7, 1975, Ser. No. 593,245
Claims priority, application France, July 9, 1974, 74.23837
Int. Cl.[2] H03H *9/26, 9/30;* H01L *27/20;* G06G *7/18*
U.S. Cl. 333—30 R **6 Claims**



1. A surface elastic wave analogue correlator having a first and a second input designed to be respectively supplied with a first and a second signal and *m* outputs each designed to deliver one of *m* samples of the correlation function of said first and second signals, *m* being a positive whole number, comprising:

a surface elastic wave delay device comprising a piezo-electric substrate, an electro-mechanical transducer located on a propagating surface on said substrate connected to said first input and adapted for emitting a surface wave propagating on said substrate and *m* surface wave sensing areas positioned for receiving said surface wave; and

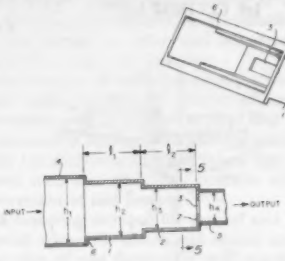
m analogue processing channels, said *m* analogue processing channels having respective input means arranged at said *m* sensing areas, each of said channels comprising a non-linear transmission device having a first input connected to the input of said channel, a second input connected to said second input of said correlator and an output, each channel further comprising integrator means having an input connected to the said output of said transmission device and an output forming one said *m* output of the correlator.

4,041,420

SHUNTED STEPPED WAVEGUIDE TRANSITION

Henry J. Riblet, 100 Westcliff Road, Weston, Mass. 02193

Filed June 30, 1976, Ser. No. 701,303
Int. Cl.[2] H01P *5/08*
U.S. Cl. 333—35 **3 Claims**



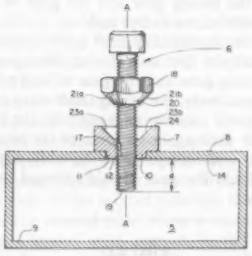
1. In a stepped transformer of the type having one or more sections of waveguide that are each substantially one quarter wavelength long at the mid-band frequency of the transformer, the improvement comprising a resonant element which provides a non-zero admittance shunting the lowimpedance end of the transformer, the resonant element being a window disposed at one end of a section of rectangular waveguide, and the integrated width and the integrated height of the window being less than the corresponding internal dimensions of the waveguides on both sides of the window.

4,041,421

STABILIZED LOCKING MECHANISM FOR THREADED TUNING SCREWS IN WAVEGUIDES

David Donald Owlett, Belmont, Calif., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed May 3, 1976, Ser. No. 682,690
Int. Cl.[2] H01P *1/20, 7/06, 1/28*
U.S. Cl. 333—73 W **4 Claims**



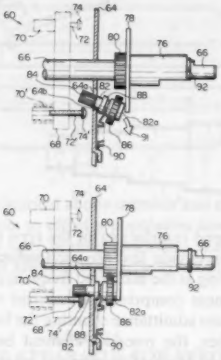
1. In a structure supporting propagation of electromagnetic waves and having a tuning screw threadably supported in an aperture in wall means thereof so as to have first and second screw portions on opposite sides of the wall means, apparatus for locking the position of the tuning screw in the structure while maintaining the axial position of the screw substantially fixed so as to prevent lateral movement thereof, comprising: a locknut being threaded onto the first portion of the screw on one side of the wall means, and a given surface on the one side of the wall means adjacent to the aperture; said locknut having a bottom surface for rotatably mating with said given surface of the wall means; said mating surfaces being tapered with respect to the axis of the screw in the aperture for maintaining the axial position of the screw substantially fixed to prevent lateral movement thereof as the locknut is threaded on the screw to securely force said mating surfaces together.

4,041,422

FINE TUNING ASSEMBLY FOR PRESET TUNER

Tasuku Noji, and Yoichi Yasuma, both of Soma, Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan

Filed July 21, 1976, Ser. No. 707,217
Claims priority, application Japan, July 25, 1975, 50-103274
Int. Cl.[2] H03J 5/28
U.S. Cl. 334—49 6 Claims



1. A tuning assembly comprising:
a frame;
a channel selector shaft rotatably supported by the frame;
a support member fixed to the selector shaft;
a plurality of tuning elements mounted on the support member, each tuning element including a rotary shaft and a gear fixed to the rotary shaft, the selector shaft being rotatable to move a selected one of the tuning elements to a tuning position;
a tuning shaft rotatably and translatably supported by the frame;
a tuning gear and an actuator member fixed to the tuning shaft;
an idler shaft rotatably supported by the frame;
first and second idler gears fixed to the idler shaft and engagable with the tuning gear and the gear of said selected tuning element respectively; and
biasing means urging the idler shaft to tilt over an edge of the frame so that the first and second idler gears disengage from the tuning gear and the gear of said selected tuning element respectively, the tuning shaft being translatable so that the actuator member engages with the idler shaft and tilts the idler shaft against a force of the biasing means so that the first and second gears drivably engage with the tuning gear and the gear of said selected tuning element respectively.

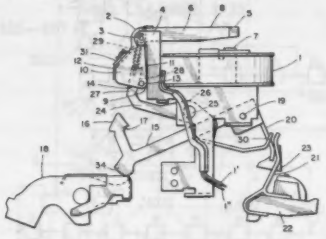
4,041,423

UNDERVOLTAGE RELEASE FOR CIRCUIT BREAKER

Darrell P. Ophaug, Marion, and Beryl W. Layton, Cedar Rapids, both of Iowa, assignors to Square D Company, Park Ridge, Ill.

Filed Dec. 8, 1975, Ser. No. 638,482
Int. Cl.[2] H01H 83/12
U.S. Cl. 335—20 14 Claims

1. An undervoltage release mechanism for a circuit breaker having main latch means and main contact opening means, comprising coil means connected in said circuit breaker in series with an electrical source for energization by said source, armature means operatively associated with said coil means; for movement by said coil means between an open and a closed position in accordance with the state of energization of said coil means, undervoltage trip means operatively associated with said armature means and with said main latch means for movement between a set position to permit said main latch means for movement between a set position to permit said main latch means to latch said main contact opening means when said armature means is in one of its said positions and a trip position to trip said main latch means for releasing said contact opening means when said armature means is in the other of its said positions, and main latch restraint means operatively assoicated with said armature means and with said main latch



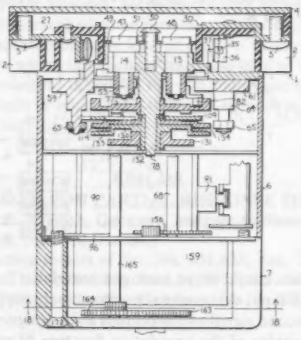
means for automatic movement by said armature means and independently of said undervoltage trip means to a released positon to permit said main latch means to latch said contact opening means when said armature means is in one of its said position and to a restraint position to restrain said main latch means from latching said contact opening means when said armature means is in the other of its said positions.

4,041,424

AUTOMATIC RESET TIMER

John L. Harris, Clearwater, Fla., assignor to Deltrol Corporation, Bellwood, Ill.

Division of Ser. No. 333,767, Feb. 23, 1973, Pat. No. 3,968,698.
This application Jan. 28, 1976, Ser. No. 652,967
Int. Cl.[2] H01H 3/00
U.S. Cl. 335—75 27 Claims



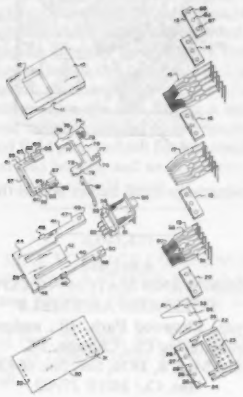
1. In an automatic reset timer having a switch, timing means, a motor, drive means driven by the motor including a clutch for driving the timing means in one direction when the clutch is engaged, reset means for returning the timing means to a starting position if the clutch is disengaged, the timing means being arranged to cause movement of the switch from a timing position to a timed-out position when driven by the motor to a predetermined position, return means controlling the return of the switch to timing position, a first controller for controlling said return means, a second controller for controlling the clutch, and means for actuating said controllers, said last named means including a common reciprocating power member and separate mechanical linkages between the power member and said controllers, and adjustable means in one of said linkages for revising the action of the reciprocating power member on its respective controller.

4,041,425

MINIATURE LOW PROFILE RELAY

Douglas J. Brush, Villa Park; David L. Vonder, Addison, and Anthony J. Wilkis, Downers Grove, all of Ill., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed June 18, 1975, Ser. No. 587,937
Int. Cl.[2] H01H *67/02*
U.S. Cl. 335—129 15 Claims



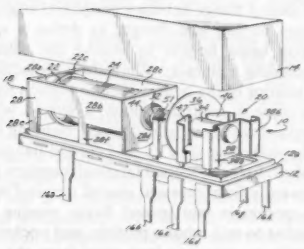
1. A low profile relay comprising:
spring pile-up means including relay springs and contacts;
bobbin means for mounting a coil;
E-core means including two outer elongated arms and a center arm shorter than said two outer arms to provide a space coplanar with the arms for locating therein said spring pile-up means, said two outer arms supporting said spring pile-up means between them in said space coplanar with the arms and said center arm supporting said bobbin means;
armature spring means mounted on said E-core means; and
armature means affixed to said armature spring means for actuating said contacts in cooperation with said coil.

4,041,426

MINIATURE ARMATURE RELAY

Zdenek S. Zemanek, Huntington Beach, and Jack M. Brown, Costa Mesa, both of Calif., assignors to Esterline Electronics Corporation, Costa Mesa, Calif.

Filed Oct. 22, 1975, Ser. No. 624,521
Int. Cl.[2] H01H *51/08*
U.S. Cl. 335—131 4 Claims



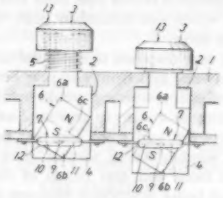
1. A miniature armature relay comprising in combination,
a generally flat coplanar header and a cover therefor,
an electromagnetic operator fixed to said header comprising an electrically energizable winding and means affording a magnetic circuit including an armature,
alignment means comprising a pair of anchor lugs fixed to said header on opposite sides of said armature and a flexible member fixed to said armature and to said anchor lugs to limit said armature to rectilinear movement,
biasing means urging said armature in one direction, the electromagnetic operator being operable to overcome said biasing means to move said armature in the direction opposite to said one direction,
at least one pair of electrically conductive mounting lugs in said header on opposite sides of said armature,
a stationary contact fixed to each of said lugs,
an electrically conductive contactor carried by said armature for reciprocatable movement into bridging engagement with said stationary contacts with corresponding movement of said armature,
and a mounting terminal for each of said lugs connected in circuit therewith within said header and extending from the edge of said flat header, said terminals being formed with a right angle exteriorly of said header for insertion in appropriate openings in a printed circuit board.

4,041,427

REED SWITCHING OPENING AND CLOSING DEVICE

Hideo Chusha, Mobara, Japan, assignor to Futaba Denshi Kogyo K. K., Japan

Filed Oct. 6, 1975, Ser. No. 620,176
Claims priority, application Japan, Apr. 15, 1975, 50-44779
Int. Cl.[2] H01H *36/00*
U.S. Cl. 335—205 5 Claims



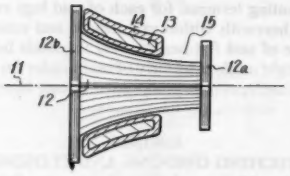
1. A reed switch opening and closing device comprising:
a reed switch having first and second reeds, the first and second reeds extending generally longitudinally along a first line, the first and second reeds being resiliently biassed so as not to contact each other unless the first reed is disposed in a magnetic field of a first polarity and the second reed is disposed in a magnetic field of a second polarity opposite to the first polarity;
a magnetic means having a first pole of the first polarity and a second pole of the second polarity, the first pole being joined to the second pole along a second line which is obliquely disposed with respect to the first line along which the first and second reeds generally longitudinally extend, the first pole generating a first magnetic field of the first polarity and the second pole generating a second magnetic field of the second magnetic polarity;
the reed switch having closed and open positions, the closed position occurring when the first reed is disposed within the first magnetic field and the second reed is disposed within the second magnetic field causing the first and second reeds to attract each other and to make contact with each other, the open position occurring when the first and second reeds are both disposed in the first magnetic field in order to overcome the peripheral influence of the second magnetic field to permit the first and second reeds to be resiliently biassed so as to not contact each other;
the switching from the closed position to the open position and from the open position to the closed position occurring with linear displacement of the second line with

respect to the first line, the second line passing through the area in which the first and second reeds contact each other when in the closed position.

4,041,428
DEFLECTION YOKE FOR USE WITH IN-LINE CATHODE RAY TUBES

Yasuo Kikuchi; Yasuyuki Ohmichi, both of Yokohama; Osamu Terasaki, and Koichi Sakai, both of Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Aug. 31, 1976, Ser. No. 719,101
Claims priority, application Japan, Sept. 2, 1975, 50-106154
Int. Cl.[2] H01F *7/00*
U.S. Cl. 335—210 **6 Claims**



1. A deflection yoke for use with an in-line cathode ray tube in which a plurality of electron beams are laid in a plane, said deflection yoke comprising:

a. a first deflection winding formed in the saddle shape with front and rear bends at both end portions thereof, through which the electron beams pass from said rear bend to said front bend when the deflection yoke is mouned on the cathode ray tube;

b. a magnetic core disposed to surround said frist deflection winding between said front and rear bends; and

c. a second deflection winding would toroidally around said magnetic core so as also to surround said first deflection winding between said front and rear bends, said second deflection winding being shorter than the distance between said front and rear bends of the first deflection winding and being positioned adjacent said front bend of the first deflection winding at one end thereof and with a predetermined space between the other end thereof and said rear bend of the first deflection winding.

4,041,429
ELECTROMAGNETIC ACTUATOR

George E. Parker, and Daniel C. Garvey, both of Fort Collins, Colo., assignors to Woodward Governor Company, Rockford, Ill.

Filed Apr. 20, 1976, Ser. No. 678,559
Int. Cl.[2] H01F *7/08*
U.S. Cl. 335—276 **18 Claims**

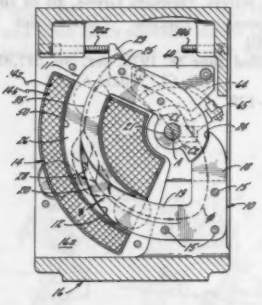
1. In an electromagnetic actuator, the combination comprising

first and second members of magnetically permeable material, one of which is a stator and one of which is a rotor,

means pivotally interconnecting said first and second members to swing relative to one another about an axis, said members being shaped to jointly form a closed ring with respective opposed extremities which approach toward or retreat from one another in jaw-like fashion as the swinging movement about said axis occurs to narrow or widen a gap therebetween,

said first member's extremity being shaped to define a tapered tooth, said second member's extremity being bifurcated to form fingers defining a tapered mouth which substantially complements said tooth, thereby to create said gap in two substantially equal halves lying respectively between the surfaces of said tooth and the opposed complemental surfaces of said mouth, and

a coil linked with the closed ring formed by said members and which, when excited, creates m.m.f. in such ring to establish magnetic flux threading the ring and dividing to

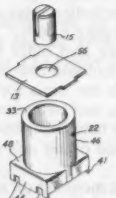


pass in substantially equal halves across the two halves of said gap.

4,041,430
COIL BOBBIN AND MATCHING COVER FOR SOLENOID ASSEMBLY

Orest Hrynewycz, Elmwood Park, Ill., assignor to Guardian Electric Manufacturing Co., Chicago, Ill.

Filed Mar. 8, 1976, Ser. No. 664,870
Int. Cl.[2] H01F *27/02*
U.S. Cl. 336—92 **4 Claims**



1. An electrical solenoid assembly comprising in combination: a core piece; a bobbin having first and second spaced flanges, said second flange having a peripheral edge; a hollow tubular portion joining said flanges to define a space, said tubular portion being hollow to receive the solenoid core piece, and including a plurality of inwardly projecting projections on the interior of the hollow tubular portion for supporting the core piece in central position; a wound wire in said space, said wound wire having lead wires extending therefrom, an outwardly projecting shelf on said second flange; an outer end on said shelf; first and second terminal members projecting laterally outwardly from recessed spaced terminal openings in said shelf, a pocket in said second flange passing from one terminal member to said tubular portion, said pocket receiving and insulatingly spacing one lead wire from the remaining portions of said wound wire, said second terminal member receiving the other lead wire, slack provided in said lead wires so as to compensate for expansion and contraction of said wound wire resulting from coil temperature variations, a re-

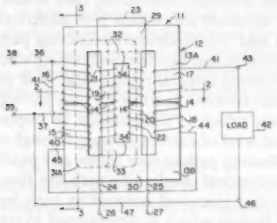
movable cover member covering said bobbin including said projecting shelf of said second flange and insulatingly covering said bobbin and said wound wire, apertures in said cover for permitting the passage of said terminal members therethrough outwardly from the edge of the second flange, a downwardly extending side portion on said cover member, said downwardly extending side portion covering said pocket forming an enclosed insulated passageway to thereby insulate said other lead from said one lead wire and said wound wire, said downwardly extending side portion of said cover fitting over the edge of the second flange intermediate the terminals, said terminals projecting outwardly through slots in the front portion a first insulating ridge integrally molded in the second flange and extending laterally downwardly from the plane of the second flange adjacent the terminals and normal thereto, said cover including an opening for receipt of a projection of the tubular member from the first flange; a second insulating ridge on the cover member parallel to and spaced from the first ridge; a U shaped field piece which fits between the ridges and cradles the cover and bobbin; and an end plate attached at the open end of the U shaped field piece.

4,041,431

INPUT LINE VOLTAGE COMPENSATING TRANSFORMER POWER REGULATOR

Gerald E. Enoksen, Karlstad, Minn., assignor to Ralph Ogden, Munster, Ind.

Filed Nov. 22, 1976, Ser. No. 743,768
Int. Cl.[2] H01F *21/08*; G05F *1/32*
U.S. Cl. 336—160 **7 Claims**



1. A transformer power regulator for efficiently and variably supplying at least 50 watts of power to a load from an A.C. voltage source while simultaneously compensating for variations from a nominal potential supplied by the voltage source, said regulator comprising:

a laminated core structure defining a primary winding leg portion, a secondary winding leg portion, and a pair of control winding leg portions, all of said leg portions being in coplanar relationship;

said control winding leg portions being intermediate to said primary and said secondary winding leg portions for effectively shunting flux induced in said primary winding leg portion away from said secondary winding leg portion;

said core structure further including back portions between said primary and secondary winding leg portions thereby defining a main magnetic flux circuit that is of closed circuit configuration and is continuous and uninterrupted between said primary and secondary leg portions;

said core structure also including bridge portions between said control winding leg portions thereby defining a control magnetic flux circuit that is of closed circuit configuration and is continuous and uninterrupted between said control winding leg portions with said control magnetic flux circuit being separate from said main magnetic flux circuit;

a control winding on each of said control winding leg portions, said control windings being electrically connected in bucking relation for application thereto of equal ampere turns for energizing same between deenergized and fully energized conditions to correspondingly vary the reluctance of said control winding leg portions between minimum and maximum conditions such that said control winding leg portions variably shunt flux from said primary winding leg portion of the main magnetic flux circuit away from said secondary winding leg portion in inverse proportion to reluctance of said control winding leg portions;

a primary winding with a plurality of turns wound about said primary winding leg portion including first and second leads for connecting same to the A.C. voltage source;

a bucking winding with a plurality of turns, but with fewer turns than said primary winding, wound about said primary winding leg portion with a first lead of same connected to one of the leads of the primary winding such that said bucking winding is phased in bucking relationship to said primary winding; and

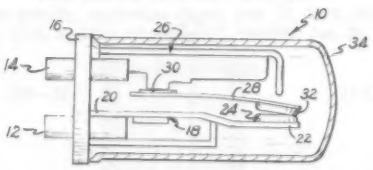
a secondary winding with a plurality of turns wound about said secondary winding leg portion with a first lead connectible to a load to which power is to be supplied, and a second lead of same connected to a second lead of the bucking winding such that said secondary winding is phased in aiding relationship with respect to said primary winding whereby most of power is transmitted from the A.C. voltage source directly through the bucking and secondary windings of the transformer regulator to the load with the bucking winding dropping a portion of the input voltage thereacross to compensate for the maximum expected over-voltage conditions of the A.C. voltage source and the secondary winding supplying an additional voltage variable by the degree of energization of said control windings to supply a regulated voltage to the load independent of deviations in the A.C. voltage source from the nominal value thereof.

4,041,432

MOTOR PROTECTOR FOR HIGH TEMPERATURE APPLICATIONS AND THERMOSTAT MATERIAL FOR USE THEREIN

Norman Yarworth, Attleboro, and Radi Pejouhy, Marshfield, both of Mass., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Sept. 16, 1975, Ser. No. 613,789
Int. Cl.[2] H01H *37/54*
U.S. Cl. 337—111 **9 Claims**

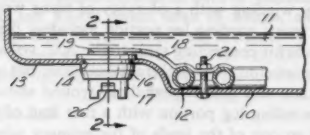


1. A composite thermostat material for use in high operating temperature overload protection devices comprising an outer layer of a first preselected metallic alloy having a relatively high coefficient of thermal expansion, a second outer layer of approximately equal thickness of a second preselected metallic alloy having a relatively lower coefficient of thermal expansion than said first preselected metallic alloy and an intermediate layer of a third preselected metallic alloy having a relatively low value of electrical resistivity, said composite having an electrical resistivity value from 20 ohm/c.m.f. to 400 ohm/c.m.f. and a flexivity value from 90×10^{-7} inches per inch per degree Fahrenheit to 110×10^{-7} inches per inch per degree Fahrenheit.

4,041,433
VENTED THERMOSTAT

Wayne T. Watson, Mansfield, Ohio, assignor to Therm-O-Disc, Incorporated, Mansfield, Ohio

Filed May 3, 1976, Ser. No. 682,745
Int. Cl.[2] H01H 61/00, 71/02
U.S. Cl. 337—112 7 Claims



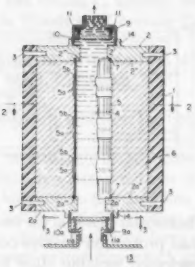
1. In combination a device having a first zone of high moisture content and a second zone of reduced moisture content and a thermostatic control for said device, said thermostat including a body assembly having two parts with a joint therebetween, said joint being substantially sealed against free flow of moisture therethrough but permitting limited flow when pressure differentials occur across said joint, said joint being in communication with said first zone, said body assembly including a vent isolated from said first zone and communicating with said second zone, said vent preventing pressure differentials from occurring across said joint.

7. A bimetal snap disc thermostat comprising a switch body, a disc cap cooperating with said switch body to define a switch cavity closed along the joint therebetween, a mounting for said thermostat tending to cause moisture to collect along said joint, said joint being provided with a sufficiently good seal to prevent material flow of moisture therethrough when a pressure differential does not exist across said joint, and a vent open to said switch cavity from a substantially dry location operable to prevent a pressure differential from occurring across said joint and allowing escape of moisture from said switch chamber.

4,041,434
COOLED ELECTRIC FUSE

Philip C. Jacobs, Jr., 53 Walden St., Newtonville, Mass. 02160, and Erwin Salzer, P.O. Box 45, Waban, Mass. 02168

Filed July 26, 1976, Ser. No. 708,396
Int. Cl.[2] H01H 85/02
U.S. Cl. 337—204 5 Claims

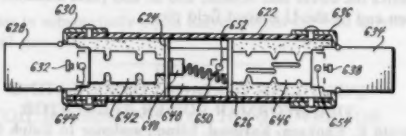


1. An electric current-limiting fuse including
a. a casing of electric insulating material;
b. a pair of terminal elements closing the ends of said casing;
c. said pair of terminal elements each having a port for the passage of fluid through said casing during the normal current-carrying operation of said fuse;
d. a tubular fusible element conductively interconnecting said port in each of said pair of terminal elements;
e. a toroidal body of quartz sand inside said casing and outside said tubular fusible element in physical contact with said tubular fusible element;
f. said tubular fusible element having a plurality of perforations covered by annular means precluding said quartz sand from penetrating into said tubular fusible element during the normal operation of said fuse, and said annular means being permeable to fluid so that said body of quartz sand is immersed in said fluid during said normal current carrying operation of said fuse.

4,041,435
PROTECTOR FOR ELECTRIC CIRCUIT

Aldino J. Gaia, St. Louis, Mo., assignor to McGraw-Edison Company, Elgin, Ill.

Filed Oct. 1, 1974, Ser. No. 511,059
Int. Cl.[2] H01H 85/04
U.S. Cl. 337—159 72 Claims



1. An electric fuse that comprises
terminals which can be secured to an electric circuit,
a first electrical conducting path which extends between said terminals.
a second electrical conducting path which extends between said terminals and which is in electrical parallel relation with said first electrical conducting path,
said terminals and said first and second electrical conducting paths being integral parts of the same piece of metal,
said first electrical conducting path having a first weak spot therein which is dimensioned to respond to a predetermined level of current flowing through said first electrical conducting path to fuse before any nearby portion of said first electrical conducting path can fuse,
said second electrical conducting path having a first weak spot therein which is dimensioned to respond to a second predetermined level of current flowing through said second electrical conducting path to fuse before any nearby portion of said second electrical conducting path can fuse,
said first weak spot in said first electrical conducting path being displaced longitudinally relative to said first weak spot in said second electrical conducting path,
said first electrical conducting path having the main part, of that length thereof which is located between said first weak spot thereof and a point which is in register with said first weak spot in said second electrical conducting path, physically disconnected from the corresponding part of said second electrical conducting path,
said first weak spot in said first electrical conducting path acting, whenever it fuses, to form a first arc in said first electrical conducting path,
said first weak spot in said second electrical conducting path acting, whenever it fuses, to form a first arc in said second electrical conducting path,
said first electrical conducting path having a second weak spot therein which is close enough to said first weak spot in said second electrical conducting path to respond to said first arc that will develop in said second electrical conducting path, as said first weak spot in said second electrical conducting path fuses, to fuse and thereby form a second arc in said first electrical conducting path,
said second electrical conducting path having a second weak spot therein which is close enough to said first weak spot in said first electrical conducting path to respond to said first arc that will develop in said first electrical conducting path, as said first weak spot in said first electrical conduct-

ing path fuses, to fuse and thereby form a second arc in said second electrical conducting path,

said electric fuse acting, as long as the total current flowing therethrough is less than the sum of the first said and of said second predetermined levels, to provide two weak spots that are in electrical parallel relation but that are displaced longitudinally,

said electric fuse acting, whenever the current flowing through said first weak spot in said first electrical conducting path exceeds said first said predetermined level and the current flowing through said first weak spot in said second electrical conducting path exceeds said second predetermined level, to permit said first arc to develop at said first weak spot in said first electrical conducting path and to permit said first arc to develop at said first weak spot in said second electrical conducting path and thereby provide two arcs in electrical parallel relation,

said second weak spot in said first electrical conducting path responding to said first arc in said second electrical conducting path to fuse and develop said second arc in said first electrical conducting path, and said second weak spot in said second electrical conducting path responding to said first arc in said first electrical conducting path to fuse and develop said second arc in said second electrical conducting path, and thereby provide two arcs in electrical series relation in said first electrical conducting path while also providing two arcs in electrical series relation in said second electrical conducting path,

said second arc in said first electrical conducting path coacting with said first arc in said first electrical conducting path to help reduce the current to zero,

said second arc in said second electrical conducting path coacting with said first arc in said second electrical conducting path to help reduce the current to zero.

whereby said electric fuse has, under normal conditions of operation, the characteristics of parallel-arranged weak spots and has, at the time it opens the circuit therethrough, the current-interrupting effect of series-arranged arcs,

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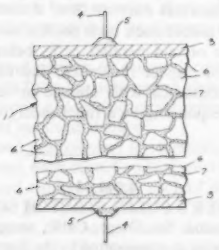
4,041,436

CERMET VARISTORS

Allan Kouchich, Milwaukee, and George W. Taylor, Oak Creek, both of Wis., assignors to Allen-Bradley Company, Milwaukee, Wis.

Filed Oct. 24, 1975, Ser. No. 625,605
Int. Cl.[2] H01C 7/10
U.S. Cl. 338—21 **10 Claims**



1. A varistor having a nonlinear current-voltage characteristic defined by the relation

$$I = (V/C)^{\alpha}$$

where I is the current flowing through the varistor, V is the voltage across the varistor, C is a constant proportional to the varistor, and α is a constant > 1 and is a measure of the nonlinearity of the varistor, said varistor having an α value in excess of 10, comprising:

an inert substrate;

a thick film associated with said inert substrate comprising a varistor composition consisting essentially of from about 75.0 to about 92.0 weight percent of a semi-conductive material and from about 25.0 to about 8.0 weight percent of glass matrix;

said semi-conductive material consisting predominantly of zinc oxide in admixture with a small amount of at least one metal oxide selected from the group consisting of chromium oxide, cobalt oxide and manganese oxide;

said glass matrix consisting primarily of a borosilicate glass with, as an additive, at least one metal oxide selected from the group consisting of cobalt oxide and manganese oxide; and

a pair of electrodes applied to said thick film.

7. A varistor having a nonlinear current-voltage characteristic defined by the relation

$$I = (V/C)^{\alpha}$$

where I is the current flowing through the varistor, V is the voltage across the varistor, C is a constant proportional to the varistor, and α is a constant > 1 and is a measure of the nonlinearity of the varistor, said varistor having an α value in excess of 10, comprising:

a bonded mass of particles comprising a varistor composition consisting essentially of from about 90.0 to about 99.0 weight percent of a semi-conductive material and from about 10.0 to about 1.0 weight percent of a glass matrix;

said semi-conductive material consisting predominantly of zinc oxide in admixture with a small amount of at least one metal oxide selected from the group consisting of chromium oxide, cobalt oxide and manganese oxide;

said glass matrix consisting primarily of a borosilicate glass with, as an additive, at least one metal oxide selected from the group consisting of cobalt oxide and manganese oxides; and

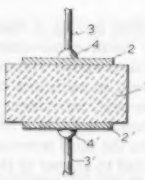
a pair of electrodes applied to said bonded mass.

4,041,437

HUMIDITY SENSOR

Mikio Matsuura; Nobuji Nishi; Masatsugu Yamaguchi, all of Hirakata; Michio Matsuoka, Ibaragi, and Takeshi Masuyama, Takatsuki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Dec. 24, 1975, Ser. No. 644,414
Claims priority, application Japan, Dec. 27, 1974, 50-2791; Jan. 20, 1975, 50-8896; Jan. 20, 1975, 50-8897; Jan. 20, 1975, 50-8898
Int. Cl.[2] H01C 13/00
U.S. Cl. 338—35 **11 Claims**



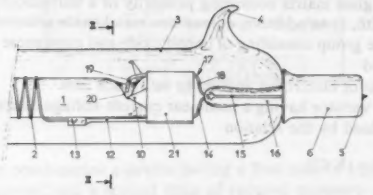
1. A humidity sensor comprising a sintered material having electrodes applied thereto, said sintered material having a negative coefficient of resistivity for relative humidity and comprising 99.99 to 10 mole percent of iron oxide (Fe_2O_3) and 0.01 to 90 mole percent of at least one member selected from the group consisting of lithium oxide (Li_2O), sodium oxide (Na_2O), potassium oxide (K_2O) and cesium oxide (Cs_2O).

4,041,438

ELECTRIC HEATING DEVICE

Odette Landeroin Duvernois, "L'Archerie", Cellettes, 41120 Les Montils, France

Filed Feb. 17, 1976, Ser. No. 658,865
Int. Cl.[2] H01C *1/024*
U.S. Cl. 338—237 **14 Claims**



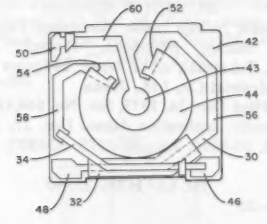
1. In a electric heating element, comprising an elongated support, a resistance wire coiled about said support and an outer tube under vacuum surrounding said support and resistance wire while being spaced therefrom; a mounting assembly provided at each end of said support and comprising a centering part having resilient outwardly projecting arms, engaged over said end of said support, said arms extending up to the inner surface of said outer tube for centrally positioning said support within said outer tube, means for retaining said part on said support end, an axial conductor provided at each end of the electric heating element, and a supply lead extending between said conductor and said resistance wire.

4,041,439

POTENTIOMETERS

Clark M. Steddom, Santa Barbara, and Charles W. Yungblut, Irvine, both of Calif., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Aug. 20, 1975, Ser. No. 606,262
Int. Cl.[2] H01C *10/00*
U.S. Cl. 338—78 **4 Claims**



1. In a potentiometer having a resistance track, a wiper element adapted for relative movement therebetween, and first, second and third terminals connected by first electrical conductors respectively to each end of said resistance track and to said wiper element, movement of said wiper element relative to said resistance track in a first direction increasing the resistance between the third terminal and a selected one of the terminals connected to an end of the resistance track, and relative movement of said wiper element in a second direction decreasing the resistance therebetween, the improvement comprising:

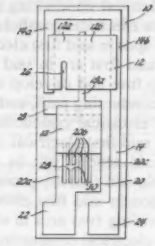
second electrical conductors connected to said first and second terminals, with said first and second terminals being disconnected from said first conductors, to reverse the electrical position of said terminals at the ends of said resistance track whereby relative movement of said wiper element in said first direction will decrease the resistance between the third terminal and said selected one end terminal, and relative movement of said wiper in said second direction will increase the resistance therebetween.

4,041,440

METHOD OF ADJUSTING RESISTANCE OF A THICK-FILM THERMISTOR

James L. Davis, and Keith E. Ewing, both of Kokomo, Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed May 13, 1976, Ser. No. 686,151
Int. Cl.[2] H01C *10/00*
U.S. Cl. 338—195 **7 Claims**



1. A functionally adjusted thick-film thermistor-resistor network having an accurate electrical resistance and change of electrical resistance with temperature corresponding to preselected values, said network comprising:

a ceramic substrate having a surface;

a thick-film cermet generally temperature stable resistor bonded to said surface;

a thick-film cermet thermistor bonded to said surface;

a plurality of thick-film cermet conductor segments bonded to said surface;

parts of said thick-film resistor, thick-film thermistor, and thick-film conductor segments overlapping one another and providing an electrical network;

said thick-film resistor having a non-printed groove therein for increasng as-formed electrical resistance of said thick-film resistor;

a plurality of parallel paths in one of said thick-film thermistor and a contacting thick-film conductor segment;

some of said parallel paths having a gap therein completely blocking electrical current flow therethrough, so as to electrically isolate each such path in said network; and

the remainder of said parallel paths being continuous and providing thermistor resistance, and change in network electrical resistance with change in temperature, accurately corresponding to a functionally tested preselected value.

4,041,441

DIVER'S PULSE STRETCH SONAR

Clarence S. Johnson, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 13, 1976, Ser. No. 714,436
Int. Cl.[2] G01S *9/66, 7/54*
U.S. Cl. 340—3 R **8 Claims**

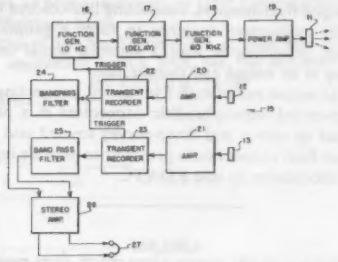
1. An apparatus for discriminating underwater targets by a diver comprising:

means carried on headgear worn by the diver for projecting spaced repetitions of single cycles of ensonifying signals above the audio spectrum to the targets;

means mounted on the headgear at opposite lateral extremes of the means for receiving echo signals of the ensonifying signals;

means coupled to the receiving means for digitizing the echo

signals and for replaying the echo signals within the audio range; and



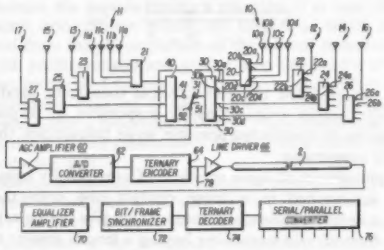
means coupled to the digitizing and replaying means for providing stored echo signals to within the audio spectrum indicative of underwater targets.

4,041,442

ACOUSTIC DATA ACQUISITION SYSTEM

Robert Alden Marquardt, Syracuse, N.Y., assignor to General Electric Company, Syracuse, N.Y.

Filed Mar. 3, 1976, Ser. No. 663,376
Int. Cl.[2] G01S *3/80*
U.S. Cl. 340—6 R **6 Claims**



6. A data acquisition system for acquiring acoustic information from objects submerged in a body of water and for transmitting the information from an array disposed in the water to remotely located data processing equipment, said array comprising:

a. first and second groups of sensors arranged to receive acoustic signals from the submerged objects, each sensor providing an analog electrical signal representative of the acoustic signal received thereby;

b. first and second multiplexers for sampling analog signals from the sensors, each of said multiplexers having a plurality of inputs and a single output, each of the inputs of said first multiplexer being connected to a corresponding one of the first group of sensors, each of the inputs of said second multiplexer being connected to a corresponding one of the second group of sensors;

c. an A/D converter for converting sampled analog signals to digital signals for transmission to the data processing equipment;

d. switching means for alternately connecting the outputs of the first and second multiplexers to the A/D converter, said switching means connecting the output of one of said multiplexers to the A/D converter while the other of said multiplexers is changing connection of its output from one of its inputs to another of its inputs, whereby any transients resulting from the changing of such connection are not transmitted to the A/D converter; and

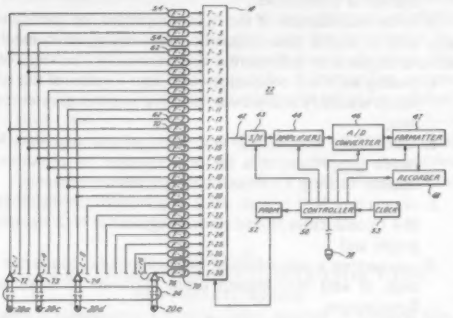
e. a single transmission line for transmitting the digital signals from the A/D converter to the data processing equipment.

4,041,443

SEISMIC RECORDING APPARATUS HAVING A TIME-VARYING SAMPLE

Ben B. Thigpen, Houston, Tex., assignor to Western Geophysical Co. of America, Houston, Tex.

Filed June 1, 1976, Ser. No. 691,795
Int. Cl.[2] G01V *1/28*
U.S. Cl. 340—15.5 AF **23 Claims**



1. A multichannel seismic signal processing and recording apparatus comprising:

a plurality of input channels for receiving seismic signals;

a plurality of seismic sensor means for applying seismic signals to said input channels;

means for initiating a seismic impulse at a predetermined location and for initiating a recording cycle;

filter means for differently filtering the seismic signals from different sets of said input channels at different times during said recording cycle; and

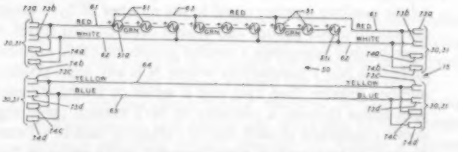
means for sampling differently filtered seismic signals at correspondingly different sample rates during said recording cycle.

4,041,444

COMBINATION FLYER-JUMPER AND METHOD OF MANUFACTURE OF SAME IN WHICH THE JUMPER/FLYER IS ASSOCIATED WITH A GEOPHYSICAL DATA ACQUISITION SYSTEM THAT PROVIDES DIGITAL DATA IN THE FIELD BEFORE RECORDING

Reid F. Carter, Houston, Tex., assignor to Chevron Research Company, San Francisco, Calif.

Filed June 28, 1976, Ser. No. 700,689
Int. Cl.[2] G01V *1/22*
U.S. Cl. 340—15.5 TS **9 Claims**



1. A geophone flyer-jumper for use in conjunction with a remote data acquisition and telemetering circuit (RDATC) equipped to receive several channels of information simultaneously, comprising:

a central geophone cable segment including N+1 conductors and a series of interconnected geophones therein where N is any positive number greater than two;

a plurality of N/2 branch cable segments connected at each end of certain of said N+1 conductors of said central cable segment; and

a series of N/2 hermaphroditic connectors connected to said plurality of N/2 branch cable segments, each of said hermaphroditic connectors having an outer housing but matched at the opposite end to a like colored and similarly electrically connected connector, whereby at least one paired, like color-coded set of connectors electrically connect to said geophones and at least another pair of like color-coded set of connectors electrically connect to certain N+1 conductors which are electrically isolated from said geophones, said at least another set of connectors having color codes that are distinct from that of said one set of connectors.

5. In the manufacture of the flyer-jumper for use in conjunction with a remote data acquisition unit equipped to receive several channels of information simultaneously, the steps of:

a. cutting an N+1 conductor cable into a series of cut segments where N is any even, positive number greater than two;

b. electrically connecting said series of cut segments between geophones of a set of geophones of preselected number to form a central cable/geophone segment;

c. connecting N/2 branch cable segments to certain of said N+1 conductors of said central segment at N/2 electrical joints; and

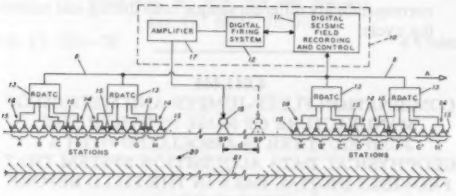
d. connecting a nonpolarized hermaphroditic connector to each of said N/2 branch cable segments to form said flyer-jumper.

4,041,445

METHOD OF CONNECTING FLEXIBLE NUMBERS OF GEOPHONE FLYER GROUPS TO DATA ACQUISITION UNITS

Reid F. Carter, Houston, Tex., assignor to Chevron Research Company, San Francisco, Calif.

Filed June 28, 1976, Ser. No. 700,688
Int. Cl.[2] G01V 1/22
U.S. Cl. 340—15.5 TS **4 Claims**



1. A method of providing a series of flyer groups made up of selected but flexible numbers of geophone flyers per group connected to a remote data acquisition and telemetering circuit (RDATC) equipped to receive a number of channels of information simultaneously comprising the steps of:

1. laying out a series of C flyer-jumpers where C is any whole positive number equal to the number of flyer-jumpers selected per group, and where each of said series of flyer-jumper comprises a central geophone cable segment including N+1 conductors where N is any even positive number greater than two and a series of interconnected geophones therein; a plurality of N/2 branch cable segments connected at each end of certain of said N+1 conductors of said central cable segment; and a series of N/2 hermaphroditic connectors connected to said plurality of N/2 branch cable segments, each of said hermaphroditic connectors having an outer housing, but matched at the opposite end to a like colored and similarly electrically connected connector, whereby at least one paired, like color-coded set of connectors electrically connect to said geophones and at least another pair of like color-coded set of connectors electrically connected to certain N+1 conductors which are electrically isolated from said geophones, said at least another set of connectors having color codes that are distinct from that of said one set of connectors;

2. between each adjacent flyer-jumpers of any C serially arranged flyer-jumpers, connecting like-colored hermaphroditic connectors together to form a geophone flyer group, providing at least a summed signal output per group at an output end thereof; and

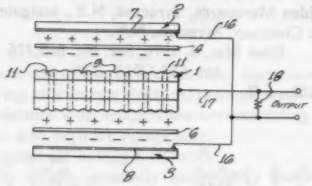
3. at said output end of each flyer group, connecting un-alike color-coded hermaphroditic connectors in a pattern repeated up-survey and down-survey toward said RDATC where final connection is provided to provide input channel information to said RDATC.

4,041,446

CAPACITIVE-TYPE DISPLACEMENT AND PRESSURE SENSITIVE TRANSDUCER

Leonard N. Liebermann, La Jolla, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 20, 1976, Ser. No. 688,210
Int. Cl.[2] G01V 1/16
U.S. Cl. 340—17 R **4 Claims**



1. An air-filled electro-acoustical transducer producing a voltage output proportionately responsive to displacement pressures of preselected acoustic wave frequencies, the transducer comprising:

a plurality of elongate members of substantially equal length sandwiched in a loose contact one with the other whereby substantial transducer lengths can be extrudable formed, said transducer having a length greater than the wave length of a particular preselected frequency of interest,

said plurality of sandwiched members including:

an outer casing member providing an enclosure formed of elongate upper and lower flexible walls and end walls, said upper and lower walls having electrically-conductive inner surfaces and being displaceable responsively to said wave pressures acting only on their outer surfaces,

a central electrically-conductive solid plate member disposed axially of said casing member flexible walls and having irregular upper and lower air-trapping surfaces and aperatures for permitting passage of said air transversely through said plate member, said plate member further having sufficient mass for remaining substantially stationary relative to said flexible wall displacements, and

a sheet-like member formed of permanently-polarized dielectric material disposed co-extensively between said stationary plate-like member and each of said upper and lower flexible walls for establishing a voltage potential between said member and said walls, and

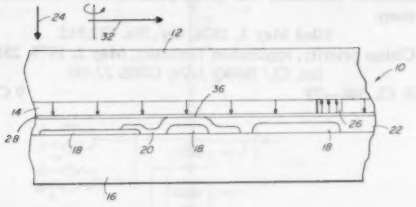
voltage-output means coupled to the conductive surfaces of said plate member and said walls, said output means including a resistance member of sufficient value for assuring a voltage output proportional to the flexible wall displacements produced by said preselected frequency of interest.

4,041,447

BONDED MAGNETIC BUBBLE MEMORY

Alfred E. Feuersanger, Framingham, and Brian A. Shortt, Weston, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Continuation of Ser. No. 520,583, Nov. 4, 1974, abandoned. This application June 4, 1976, Ser. No. 693,069
Int. Cl.[2] G11C *19/08*
U.S. Cl. 340—174 TF 2 Claims



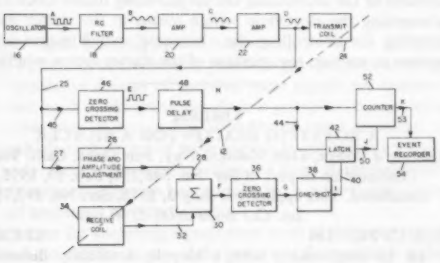
1. A bubble memory device of the type adapted to operate at a rate in excess of 50K bits per second comprising:
   a. a first substrate made of a single crystal, nonmagnetic material and having a planar surface thereon,
   b. a thin film, single crystal layer of a magnetic material on the planar surface of the first substrate,
   c. a second substrate made of a non-conductive and nonmagnetic material and having a planar surface thereon,
   d. a desired pattern of thin film magnetic elements and conductive elements on the planar surface of the second substrate, the pattern having a plurality of at least three, spaced, non-colinear points, the heights of which measured from the planar surface of the second substrate are equal, predetermined and greater than the heights of the other portions of the elements, the layer on the first substrate being adjacent to and in contact with the spaced points so that a controlled spacing is maintained over the entire juxtaposed substrates of the resulting bubble memory device, and
   e. a quantity of Canada balsam cement composition disposed around the peripheral portions of the substrates and partially within the space between the substrates for securing the substrates in the juxtaposed orientation, the variation in spacing between the first and second substrates being no greater than 500 A.

4,041,448

ELECTRONIC RAILROAD TRACK MARKER SYSTEM

Richard H. Noens, Arlington Heights, Ill., assignor to Vapor Corporation, Chicago, Ill.

Filed Aug. 5, 1976, Ser. No. 711,996
Int. Cl.[2] G08C *25/00, 21/00*
U.S. Cl. 340—32 11 Claims



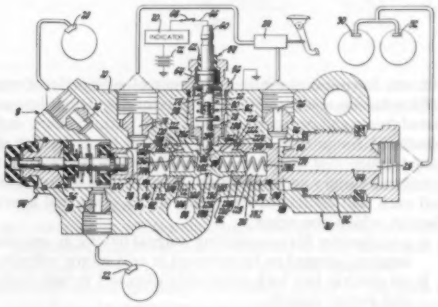
1. A vehicle position detector comprising:
means for generating an oscillating signal;
a transmit coil mounted on the vehicle and connected to the output of the generating means for radiating an electromagnetic signal having the frequency of the oscillating signal;
a receive coil mounted on the vehicle in proximity to the transmit coil;
means connected to the receive coil for canceling any interferring signal induced in the receive coil as a result of its proximity to the transmit coil;
means connected to the output of the canceling means for detecting a position indicating signal which exceeds a predetermined amplitude;
means connected in circuit with the output of the detecting means for sampling the output at predetermined clocking intervals to determine the phase relation between a detected signal and a clocking signal having the same frequency as the generating means, the sampling means latching into a set state when a preselected phase relation exists; and
counter means responsive to the latching of the sampling means for a predetermined count, the counter means generating a signal indicating that a preselected position has been detected.

4,041,449

FAILURE WARNING SWITCH ACTUATOR WITH AUTOMATIC RESET

Ronald L. Shellhause, Vandalia, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 21, 1976, Ser. No. 678,910
Int. Cl.[2] B60T *17/22*
U.S. Cl. 340—52 C 4 Claims



1. A dual pressure circuit failure warning actuator comprising:
a cylinder having a center section and end sections and adapted to receive pressure from one pressure circuit in one end and pressure from the other pressure circuit in the other end;
first and second pistons reciprocably received in said cylinder in axially spaced relation, each of said pistons having an end wall adapted to be acted upon by one of the pressures to urge said pistons toward the cylinder center;
a shuttle member reciprocably received in said cylinder axially between said piston end walls and having failure warning actuating means operable to actuate a failure warning device upon a predetermined movement of said shuttle member in either axial direction from a center position in said cylinder in response to a predetermined pressure differential across said pistons, and shuttle member latching means including said actuating means and adapted to latch said shuttle member to prevent recentering movement after it has been moved said predetermined amount in one axial direction;
a pair of centering springs with one acting on each side of said shuttle member and on one of said pistons to continu-

ally urge said pistons toward said cylinder ends and said shuttle member to its center position;

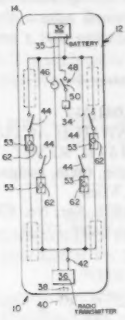
and means on and including said pistons adapted to act to overcome the latching of said shuttle member latching means and to return said shuttle member to its center position by movement of said pistons toward said cylinder center section by substantially equal forces generated when both pressures concurrently increase to a predetermined pressure level.

4,041,450

INTRUSION ALARM-IGNITION CONTROL SYSTEM FOR A MOTOR VEHICLE

James Knight, 1838 Hone Ave., Bronx, N.Y. 10460, assignor to Lawrence Peska Associates, New York, N.Y.

Filed Apr. 10, 1975, Ser. No. 566,948
Int. Cl.[2] B60R *25/10*
U.S. Cl. 340—64 **8 Claims**



1. An intrusion alarm ignition control system for a motor vehicle having a body with a plurality of doors and their associated frame and opening, a hood of said motor vehicle and its associated frame and opening, an engine hood and its associated frame and opening, an ignition wire communicating between a battery and an ignition switch of said motor vehicle, and each said associated frame having an elongated aperture therein, which comprises:

a. a transmitter for transmitting a signal having an associated antenna adapted to be received in said motor vehicle;

b. an electric key lock receivably disposed in said body of said motor vehicle;

c. a plurality of activation switches adapted to be received in said frame, each said activation switch being activated upon opening of one of said doors, said engine hood, and said trunk hood;

d. means for preventing closure of said doors, said engine hood, or said trunk hood, said means including an elongated bar having a pair of ends with a transverse central pin member extending through said elongated bar, the ends of said pin adapted to be rotatably received in said frame with said bar adapted to be rotatably received in said elongated aperture of said frame, an electromagnet element wired in series to each said activation switch, each said activation switch received in said aperture below one said end of said bar, a coil spring adapted to be received in each said aperture below said other end of each said bar and affixed onto said other end of said bar, and parallel circuits of each said series circuit of said electromagnet element and said activation switch wired between said battery and said electric key lock switch;

e. means for preventing flow of current through said ignition wire upon activation of said activation switch, said means including an electromagnet member wired in series between said transmitter and said battery, a lever type electric switch member adapted to be received in said ignition wire, said electromagnetic member opening and closing said lever type electric switch upon the opening and closing of one of said activation switches;

f. a receiver unit located remotely from said radio transmitter for receiving said signal; and

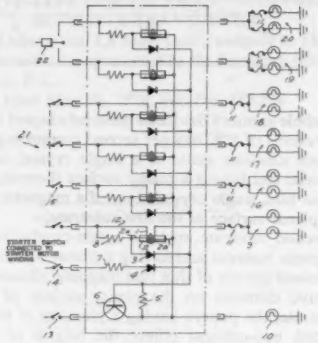
g. a signal device associated with said receiver unit.

4,041,451

CIRCUIT FOR MONITORING THE OPERATIVENESS OF CURRENT-CONSUMING ELECTRICAL DEVICES

Konstantin Zarkadas, Am Lindenplatz 5, 3014 Laatzen, Germany

Filed May 3, 1976, Ser. No. 682,912
Claims priority, application Germany, May 2, 1975, 2519725
Int. Cl.[2] B60Q *1/26*; G08B *21/00*
U.S. Cl. 340—79 **9 Claims**



1. In an automotive vehicle provided with a starter motor having a starter motor winding and at least one current-consuming electrical device receiving current via a current path, a monitoring circuit for monitoring the operativeness of the at least one electrical device, comprising, in combination, indicating means operative when activated for providing an indication; control means operative for activating the indicating means when proper current ceases flowing in the current path of the monitored electrical device, the control means including an inert-gas reed switch and electronic switch means electrically connected to the inert-gas reed switch and controlled by the latter, the inert-gas reed switch and the electronic switch means connecting the indicating means to the current path of the monitored electrical device and being operative for controlling the activation of the indicating means, and inductance means connected in the current path of the monitored electrical device and operative for generating a magnetic field which controls the operation of the reed switch in dependence upon the flow of current through the current path of the monitored electrical device; and checking means for checking the operativeness of the monitoring circuit including means electrically connecting the electronic switch means to the starter motor winding for controlling the electronic switch means in response to start-up energization of the starter motor winding.

4,041,452

A ROTATING BEACON FOR A BICYCLE

Castulo J. Moya, 8166 Molokai Way, Fair Oaks, Calif. 95628

Continuation-in-part of Ser. No. 548,254, Feb. 10, 1975, abandoned. This application July 3, 1975, Ser. No. 592,754
Int. Cl.[2] B62J *3/00, 5/00*
U.S. Cl. 340—134 **12 Claims**

12. In combination with a bicycle, a visually detectable warning device comprising a beacon including a housing, an elongated staff having a base end portion and a distal end portion, means releasably securing the base end portion of said staff to said bicycle with the distal end portion thereof being

projected substantially upwardly therefrom, when the bicycle is in an operative configuration, means for generating a beam of light including a light source comprising an electrically

energizable lamp disposed in said housing for propagating a beam of light from the housing, and means rotatably connecting said housing to the distal end portion of said staff.

4,041,453

SIGNAL HANDLING SYSTEM FOR MINIMIZING DROPOUT EFFECT

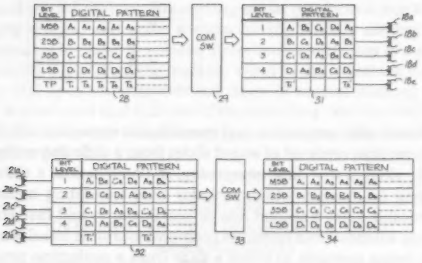
Kenkichi Umeda; Shoichi Nakamura, both of Tokyo; Jun Takayama, Kokubunji; Tetsuya Horichi, Yokohama, and Yoshikazu Tsuchiya, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Nov. 14, 1974, Ser. No. 523,918

Claims priority, application Japan, Nov. 20, 1973, 48-130405

Int. Cl.[2] H03K *13/243*

U.S. Cl. 340—146.1 BE **11 Claims**



1. A signal handling system comprising:

A. a plurality of electrically parallel signal paths over which successive groups of encoded pulse signals are transmitted, each of the pulse signals in a group having a certain weighting factor, a like plurality of input terminals to which each group of pulse signals is applied at a certain rate, those pulse signals having the same weighting factor in respective groups being applied to a corresponding one of said input terminals; and

B. means for switching signals from each of the input terminals to a different one of the paths in a determinable order at the same rate as the rate at which said pulse signals are applied, whereby successive pulse signals of the same weight in successive groups are not transmitted through the same path in succession so as to substantially minimize the possibility of having two successive dropouts of the same pulse weight in any path.

4,041,454

DATA HANDLING SYSTEM WITH REMOTE DOCUMENT SCANNER

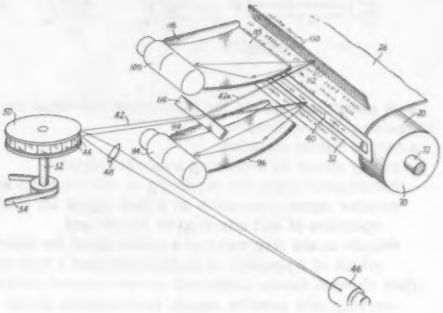
David H. Shepard, Rye, and Edward J. Gushue, Bedford Hills, both of N.Y., assignors to Cognitronics Corporation, Stamford, Conn.

Continuation of Ser. No. 569,051, April 17, 1975, abandoned, which is a continuation of Ser. No. 66,149, Aug. 21, 1970, Pat. No. 3,893,079, which is a continuation of Ser. No. 624,445, March 20, 1967, abandoned. This application July 12, 1976, Ser. No. 704,575

The portion of the term of this patent subsequent to July 1, 1992, has been disclaimed.

Int. Cl.[2] G06K *9/12*

U.S. Cl. 340—146.3 F **3 Claims**



1. Data handling apparatus including means for scanning documents carrying graphic indicia; said apparatus comprising:

a first station having a document scanning unit including means to support a document in geometrical shape presenting contiguous, parallel straight-line elements passing through the graphic indicia;

said scanning unit also including a laser producing a beam of coherent radiation which is directed to said document to develop thereon a spot of light of small diameter;

scanning means including a rotatable mirror in the path of said beam for repetitively sweeping said laser beam along a scan path extending parallel to said straight-line elements;

means for advancing said document in synchronism with the operation of said scanning means so as to scan said graphic indicia with a series of successive adjacent scan paths parallel to each other and also parallel to said straight-line elements of said document;

said advancing means being constructed and arranged to provide said adjacent scan paths with center-to-center spacings at least approximately equal to said diameter of said spot of light;

sensing means to detect light reflected from the document as a result of the scanning thereof by said laser beam;

clock means coupled to the output of said detecting means for producing scan signals in the form of binary sample pulses each indicating the presence or absence of graphic indicia elements at corresponding regularly-spaced positions along each scan path with said positions being identical for successive scan sweeps;

a second station having receiving means for processing the graphic indicia information represented by said scan signals;

transmission means coupling said first station to said second station; and

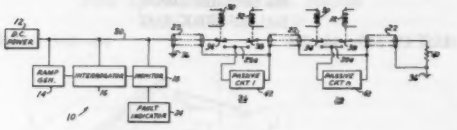
means at said first station responsive to said scan signals to develop and to direct to said transmission means corresponding signals suitable to be sent through said transmission means to said receiving means at said second station to transfer thereto the graphic indicia information representing said graphic indicia.

4,041,455

INTERROGATION AND MONITORING SYSTEM

Gayle Russell Norberg, Columbia Heights, Minn., assignor to Control Data Corporation, Minneapolis, Minn.

Filed Aug. 2, 1976, Ser. No. 710,989
Int. Cl.² G06F *11/00*; G08B *29/00*
U.S. Cl. 340—146.1 C **13 Claims**



1. A monitoring system for monitoring individual modules comprising, in combination:

a central station including:

supply means for supplying a monitor signal,

interrogator means for supplying an interrogation signal,

monitor means responsive to a fault signal for initiating operation of said interrogator means, and

decode means responsive to a coded signal for indicating which of a plurality of modules initiated a fault signal;

data channel means connected to said central station for carrying said monitor signal, interrogation signal, fault signal and coded signal; and

a plurality of remote stations connected to said data channel means, each of said remote stations including:

responder means, and

switch means responsive to a fault condition in the respective module for connecting said responder means to said data channel means,

said responder means including first circuit means responsive to said monitor signal for supplying said fault signal to said data channel means, and passive circuit means responsive to said interrogation signal for supplying said coded signal to said data channel means, the coded signal of each responder means being unique to each such responder means, whereby, upon the occurrence of a fault condition in a module, the data channel means is connected to the respective responder means and said respective responder means supplies a fault signal to said monitor means, whereupon said monitor means operates said interrogator means to supply said interrogation signal, and the respective responder means responds to interrogation signal to supply said coded signal indicative of the faulted module to said decode means.

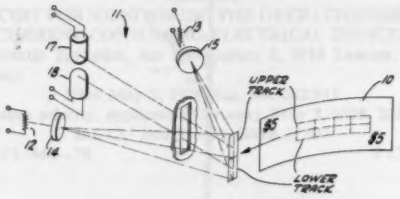
4,041,456

METHOD FOR VERIFYING THE DENOMINATION OF CURRENCY

David M. Ott; Cynthia Bunce Ott, both of 1720 Walnut St., El Cerrito, Calif. 94530, and John G. Stoides, 206 W. Asher, Culpeper, Va. 22701

Filed July 30, 1976, Ser. No. 710,217
Int. Cl.² G06K *9/00*
U.S. Cl. 340—146.3 R **11 Claims**

1. A method for verifying the denomination of currency relative to other denominations of such currency using digital logic with a memory comprising the following steps: storing in said memory a pattern representative of the reflectivity of at least one predetermined segment of at least one currency denomination; scanning a currency to be verified as having said one denomination over said one predetermined segment and generating a pattern representative of such semgent; comparing said pattern of said scanned currency with said stored pattern of said one denomination and generating a quantitative function indicative of the amount of comparison between said



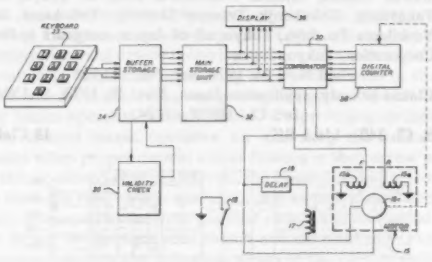
patterns; storing quantitative functions indicative of the amount of comparison between said stored pattern of said one denomination and corresponding segments of said other denominations; comparing each of said quantitative functions of said other denominations with said generated quantitative function.

4,041,457

SOUND-SLIDE PROJECTOR CONTROL APPARATUS

Herbert Joachim Koch, Tiefenthaler Strasse 13, D-62 Wiesbaden, Germany

Filed Mar. 16, 1976, Ser. No. 667,362
Int. Cl.² H04Q *9/00*; G03B *23/02, 23/12*
U.S. Cl. 340—147 MD **6 Claims**



6. Sound-slide projection and transmission apparatus which allows random retrieval of sound slides from a slide tray reciprocable along a first axis, comprising, in combination, a slide-changing mechanism which includes slide translating means reciprocable along a second axis perpendicular to said first axis between extended and retracted positions, said slide translating means being operable to move a slide from a projection position to within said tray upon translation from said extended position to said retracted position and operable to move a slide from within said tray to said projection position upon translation from said retracted position to said extended position, said apparatus including a flywheel, and means for mechanically connecting said mechanism to be operated by said flywheel, said mechanism being operated through a cycle each time it is operated by said flywheel, said cycle consisting of a translation from said extended position to said retracted position followed by translation from said retracted position to said extended position; a reversible drive motor means connected to position said tray along said first axis, keyboard means for providing signals representing a slide desired to be retrieved; a solenoid operable to interrupt operation of said slide-changing mechanism by said flywheel; and switch means for temporarily operating said solenoid and connecting said motor to respond to

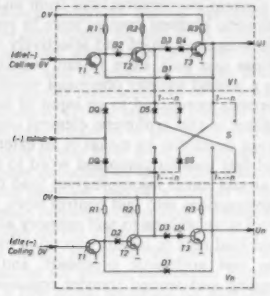
said signals when said slide translating means is translated to said retracted position.

4,041,458

ARRANGEMENT FOR CARRYING OUT RANDOM SELECTION AMONG A PLURALITY OF SELECTABLE DEVICES IN A TELECOMMUNICATION SYSTEM

Eugen Gravdahl, Hagersten, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Sept. 27, 1976, Ser. No. 727,025
Claims priority, application Sweden, Oct. 17, 1975, 7511664
Int. Cl.² H04Q *3/42*
U.S. Cl. 340—166 R **3 Claims**



1. Arrangement in a telecommunication system for random selection of one among a plurality of devices each being associated with a marking wire indicating by its condition whether said device is selectable or not containing, a selecting chain consisting of a number of switching circuits each connected to one of said devices, means in each switching circuit for preventing upon activation of one of said circuits activation of other switching circuits of the chain, a logical circuit with bistable characteristics included in each switching circuit, a gate circuit being connected to the input of each switching circuit which gate circuit at a first input is activated by the condition of said marking wire, one pulse signal source for each of said gate circuits sending pulses to a second input of the gate circuit, said pulse sources having slightly different frequencies in order to achieve a random transmission of a conditioning signal from the marking wires to the switching circuits so that upon simultaneous activation of several marking wires it is prevented that that one of the switching circuits which due to the characteristics of its components is most rapid always is selected first.

4,041,459

INTEGRATED PROGRAMMABLE LOGIC ARRANGEMENT

Karlheinrich Horninger, Eglharting, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Apr. 28, 1976, Ser. No. 681,170
Claims priority, application Germany, Apr. 29, 1975, 2519078
Int. Cl.² G11C *8/02, 11/40*
U.S. Cl. 340—166 R **8 Claims**

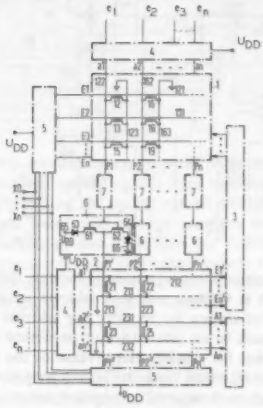
1. An integrated, programmable logic arrangement comprising:

a. an AND-matrix and an OR-matrix, each having individual gates, each gate having a selector line, a base line, and a control line;

b. switching transistors being provided at AND-matrix intersection points, each point being formed by an intersecting control line and selector line, each of said switching transistors having a gate terminal connected to the intersecting control line, one end of the switching transistor being connected to the intersecting selector line, and the other end being connected to a base line connected to a reference potential;

c. switching transistors being provided at OR-matrix intersection points, each point being formed by an intersecting control line and selector line, each of said switching transistors having a gate terminal connected to the intersecting control line, one end of the switching transistor being connected to the intersecting selector line, and the other end being connected to a base line connected to a reference potential;

d. each control line of the OR-matrix being connected via an inverter to a selector line of the AND-matrix;



e. said switching transistors in the AND- and OR- matrices comprising MI_1I_2S (metal-insulation **1-insulation 2-semi**-conductor) storage transistors; and

f. decoder means for the production of a logic pattern in the AND and OR-matrices comprising,

1. a decoder having outputs connected to each control line of the AND-matrix, a decoder having outputs connected to each control line of the OR-matrix, said decoders having inputs for writing in a logic pattern, and

2. a decoder arrangement having outputs connected to each selector line of the AND-matrix, a decoder arrangement having outputs connected to each selector line of the OR-matrix, said decoder arrangements having inputs for items of information.

4,041,460

MULTI-PROCESSOR DATA PROCESSING SYSTEM PERIPHERAL EQUIPMENT ACCESS UNITS

Graham John Wisdom; Peter Verne Creteau, both of Wimborne, and John Lloyd Williams, Cambridge, all of England, assignors to Plessey Handel und Investments AG., Zug, Switzerland

Filed May 17, 1976, Ser. No. 686,925
Claims priority, application United Kingdom, May 17, 1975, 21061/75
Int. Cl.² G06F *11/06*
U.S. Cl. 364—900 **1 Claim**

1. A data processing system comprising in combination

a plurality of processor modules;

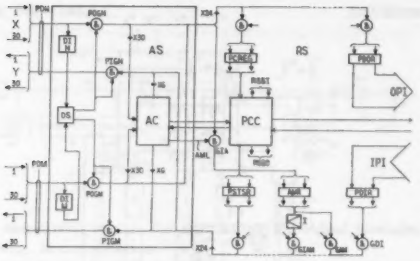
a plurality of data communication paths, one for each processor module allocated on a mutually exclusive basis and arranged to carry processor module generated address information;

a plurality of multi-port access units each including a data communication path selection and terminating means and an identity address recognition means conditioned with a unique identity code and responsive to the reception of said unique identity code within said address information

when applied to any one of said data communication paths;

a plurality of memory modules each including an individual access unit and

a group of peripheral equipments each including an individual access unit and each peripheral equipment access unit includes a plurality of processor module accessible registers and an unaccessible register selection means responsive to part of said address information, wherein the improvement comprises the provision in each access unit of an address monitor register into which the address information received from a processor module data communication path is written and said address monitor register includes first means for sending the address information received back to an interrogating processor module and second means for sending the inverse of the said address information received back to the interrogating processor module and said accessible register selection means is conditioned by the reception of a first register selection address to activate said first means and by the reception of a second register selection address to activate said second means.



4,041,461

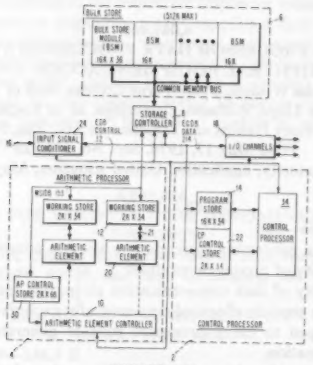
SIGNAL ANALYZER SYSTEM

Gary L. Kratz, Warrenton; William W. Sproul, III, Reston, both of Va.; Eugene T. Walendziewicz, Wakefield; Donald E. Wallis, Marblehead, both of Mass., and Charles A. Dennis, Warrenton, Va., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed July 25, 1975, Ser. No. 599,306

Int. Cl.[2] G06F *9/10, 13/00*

U.S. Cl. 364—200 **40 Claims**



SYSTEM DATA FLOW

1. A digital computer system comprising:

an arithmetic processor containing a plurality of pipelined processor arithmetic elements in parallel array with each element connected to a respective working store for temporarily storing data, with all of the elements being connected to and under microprogram control of an arithmetic element controller, for arithmetically processing said data;

said arithmetic element controller including an arithmetic element control store for storing arithmetic element microinstructions and a memory address register connected to an address input of said arithmetic element control store for accessing said arithmetic element microinstruction;

a bulk store for storing said data and said arithmetic element microinstructions prior to the time of an initial microprogram load into said arithmetic processor;

a storage controller connected to said bulk store and to said working store and said arithmetic element control store in said arithmetic processor for selectively transferring said arithmetic element microinstructions from said bulk store to said arithmetic element control store in response to a first transfer command word and selectively transferring said data from said bulk store to said working store in response to a second transfer command word;

a control processor connected to an input of said memory address register in said arithmetic element controller and to said storage controller by means of an external bus, for sending said first transfer command word to said storage controller at said initial microprogram load time to load said microinstructions into said control store, for sending a first control store address to said memory address register after said load time to initiate execution by the microprogram in said arithmetic processor, and for subsequently sending said second transfer command word to said storage control during execution time, to transfer said data to said working store;

whereby the control processor is free to carry out supervisory and data management functions during said execution time and the program storage and data storage functions are separated during execution time, minimizing storage bandwidth requirements.

4,041,462

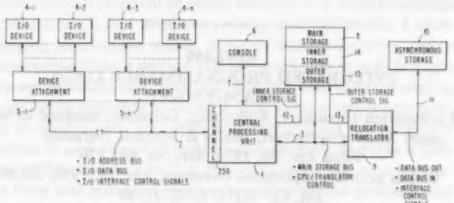
DATA PROCESSING SYSTEM FEATURING SUBROUTINE LINKAGE OPERATIONS USING HARDWARE CONTROLLED STACKS

Michael Ian Davis; Gary Wayne Mayes; Thomas Stephen McDermott, and Larry Edward Wise, all of Boca Raton, Fla., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 30, 1976, Ser. No. 682,002

Int. Cl.[2] G06F *9/18*

U.S. Cl. 364—200 **7 Claims**



1. A subroutine linkage feature for a data processing system enabling the preservation of register contents of a requesting program and allocation of a dynamic work area for data generated during the subroutine operation, comprising:

main storage means having sequentially addressable storage locations for storing information representing control signals and data signals;

level storage means, said level storage means comprising a plurality of groups of prioritized level registers for storing and providing signals representative of significant information relative to program execution such as instruction

addresses, level status indications and other information pertaining to the programs to be executed;

level control means interconnected with said level storage means and responsive to sequencing control signals during operation of said system to operate said level storage means to select said level register groups for transfer of information to and from said level registers in accordance with a predetermined priority arrangement;

an instruction source, said source providing signals representative of operations to be performed in said system as well as information to be utilized;

sequencing means responsive to signals from said instruction source including signals representative of a subroutine operation for providing control signals in timed sequence and including means for generating subroutine call signals from calling programs during operation of individual programs determined by said level control means in said system together with related Register to Storage instruction signals, said Register to Storage instruction signals including signals representative of (1) a Register to Storage Operation, (2) the starting address of a block of selected storage locations in said main memory, (3) at least one register in said level level storage means, said at least one register including an instruction address indicative of the calling program, and (4) a number of storage location in said main memory comprising a dynamic work area to be accessed during a subroutine operation;

microcode storage means having individual microcode storage locations for storing microcode signal sequences including a first signal sequence for activating said system according to a predetermined Register to Storage sequence to (1) transfer the contents of the selected at least one register from the level register group in current use to the selected block of said main storage and to (2) reserve the dynamic work area in the selected block specified by said Register to Storage instruction signals;

microcode address means responsive to a single Register to Storage instruction signal set from said sequencing means to access in sequential order the microcode Register to Storage signal sequence in said microcode storage means; and

decode means interconnected with said main storage means, said level control means, and said sequencing means and responsive to a microcode Register to Storage signal sequence as it is accessed to generate control signals to activate said main storage means, and said level control means in accordance with said predetermined Register to Storage signal sequence.

4,041,463
DOCUMENT FILING, UPDATING AND RETRIEVAL SYSTEM

Joel Slutzky, Placentia; LeeRoy W. Hausman, Jr., Fullerton, both of Calif., and Ronald F. Kostenbauer, Buffalo, Wyo., assignors to Infodetics, Inc., Anaheim, Calif.

Filed Jan. 22, 1976, Ser. No. 651,472
Int. Cl.² G11B *27/02*
U.S. Cl. 364—900 **12 Claims**

1. A document storage and retrieval system for filing and updating source documents comprising:

storage means having a plurality of storage locations, each storage location having first and second areas;

filing means for converting the images on a source document to an electronic image signal representative of said images on said source document;

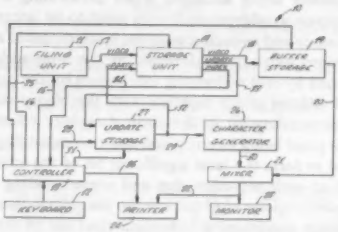
means for generating electronic update signals representative of update information for source documents;

controller means for logically and selectively directing said image signals to said first areas of said storage locations and said update signals to said second areas of said storage locations, the update signals for a particular source document being stored in the same storage location as the image signal therefor;

output means for reproducing source documents from the image signals representative thereof;

means operatively controlled by said controller means for selectively conducting the image signals stored in any said first area of any said storage location to said output means; and

means operatively controlled by said controller means and

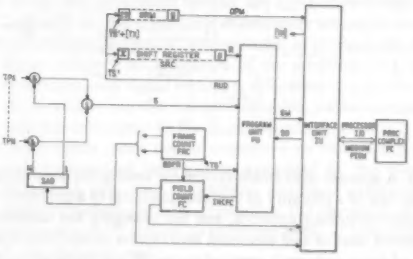


responsive to said image signals from said conducting means and said update signals from said storage means for selectively mixing the update signals stored in said second area of the same said storage location with said image signals stored in said first area for conduction to said output means whereby said output means reproduces said source document without the update information represented by the update signals therefor.

4,041,464
DATA PROCESSING SYSTEMS

John Spencer Arnold, Liverpool, England, assignor to Plessey Handel und Investments AG., Zug, Switzerland

Filed July 1, 1975, Ser. No. 592,263
Claims priority, application United Kingdom, July 2, 1974, 29191/74
Int. Cl.² G06F *9/16, 3/00*
U.S. Cl. 364—200 **5 Claims**



1. A scanner for use as an interface equipment between a plurality of binary digital data scan points to be interrogated and a central data processing equipment, the scanner being arranged to detect, temporarily store and report changes of state of the scan points by cyclically performing a scanning sequence, the scanner including:

a counter means and scan point selection means for cyclically interrogating the state of each of the scan points during a scanning sequence,

a control register having at least one location for each scan point and being arranged to store information relative to the condition of the scan point when last interrogated and

a program unit including (1) a program memory each location of which stores information which includes a program memory adjustment value and a control register conditioning indication, (2) a program memory addressing mechanism for selecting the program memory location to be read out in accordance with an n-bit address word and

(3) an address adder for forming the n-1 most significant bits of said address word by adding (a) a memory adjustment value read from the program memory to (b) the n-1 most significant bits of the current memory address in said program memory addressing mechanism and (c) the binary value of the state of the scan point currently being interrogated,

the scanner being arranged when performing a scanning sequence to address each scan point to be interrogated in sequence and as each scan point is interrogated a program memory location is addressed by the n-bit address word formed by said addressing mechanism by the output from said address adder together with the binary state of the corresponding bit in the control register relative to the scan point being interrogated said corresponding bit being used to form the least significant bit of the address word and at each sequence step and corresponding bit in the control register after use is set to the state indicated by the register conditioning indication read out of the program memory during the current scanning sequence step.

4,041,465

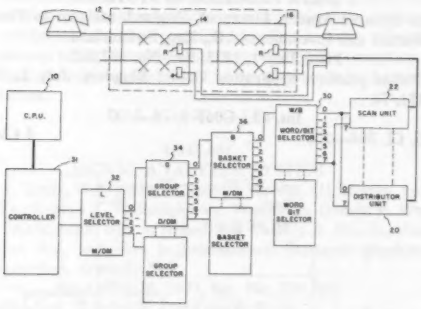
SCANNER-DISTRIBUTOR APPARATUS FOR MATRIX SYSTEM

Howard Jeffery Conerly, Milan, Tenn., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Apr. 27, 1976, Ser. No. 680,743

Int. Cl.[2] G06F *3/00*; H04M *3/22*; H04Q *3/54*

U.S. Cl. 364—900 **7 Claims**



1. A scanner-distributor system for testing the condition of at least one of a plurality of bi-stable elements of a processor-controlled switching network, and for changing the condition of selected ones of said elements, said system comprising a plurality of drive units each coupled to one of said elements and each individually activatable for changing the condition of the coupled element on activation of the coupled drive unit, and a plurality of scan units each coupled to one of said elements for testing the condition of the element on activation of the coupled scan unit, with each of said elements being represented by a predetermined address word for controlling access to that element, an electronic plural stage multiplexer for accessing each of said drive units and scan units through the use of a multiple bit address word emanating from said processor with each stage of said multiplexer network corresponding to certain bits of address word of a selected element, and logic means for controlling the transmission of a selected address word from said processor through said multiplexer to select the drive unit coupled to the element represented by the selected address word, and said logic means operative to activate a plurality of drive units represented by a predetermined portion of a selected address word to change the condition of all elements having said predetermined portion in their addresses.

4,041,466

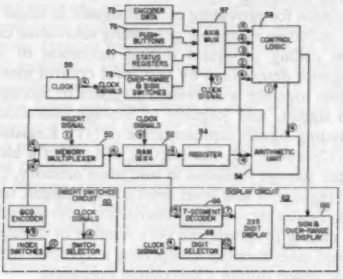
MULTI-AXIS ENCODER PROCESSING AND DISPLAY SYSTEM

Robert W. Stuart, Bedford, Morocco, assignor to Dynamics Research Corporation, Wilmington, Mass.

Filed Jan. 19, 1976, Ser. No. 650,541

Int. Cl.[2] G06F *15/46*

U.S. Cl. 364—900 **7 Claims**



1. A system for processing signals from a plurality of positional encoders indicating the movement or non-movement thereof, to provide output signals representative of the position of each of the encoders, said output signals being selectively representative of encoder position in one of at least two different sets of dimensional units, comprising:

storage means for storing data representative of each digit of a plurality of first multi-digit values, each value being representative of a first position of a respective encoder;

means for sequentially retrieving from said storage means said data representative of each of the stored digits;

means for selecting the dimensional units in which said encoder positions are to be represented and for producing a signal representative thereof;

means periodically operative in response to the signals from the encoders for individually processing the retrieved data representing each digit of said plurality of multi-digit values to produce data representative of each digit of a plurality of subsequent multi-digit values representing the subsequent position of each of the encoders, said processing means including:

clock means for producing signals indicating which digit of which multi-digit value is being processed by the processing means;

control means, operative in response to the signals from said selecting means and to the signals from said plurality of encoders, for determining proper values to be added to or subtracted from each of the digits as the data representative thereof is sequentially retrieved by said retrieving means; and

means responsive to said control means for adding and subtracting said proper values to said first plurality of multi-digit values to produce said subsequent plurality of multi-digit values; and

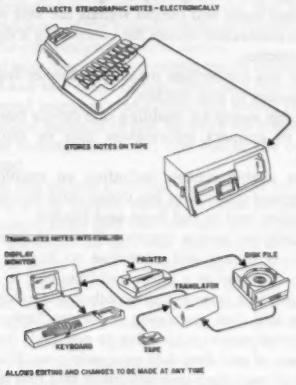
means operative for storing in the storage means the data representative of each of the digits of the subsequent multi-digit values representing the then present position of each of the encoders.

4,041,467

TRANSCRIBER SYSTEM FOR THE AUTOMATIC GENERATION AND EDITING OF TEXT FROM SHORTHAND MACHINE OUTLINES

Dan E. Cota, Los Angeles; Ted R. Charter, Santa Ana; Robert M. Beeson, Palos Verdes Estates, all of Calif., and Robin D. Kinkead, Dallas, Tex., assignors to Xerox Corporation, Stamford, Conn.

Filed Nov. 28, 1975, Ser. No. 636,268
Int. Cl.[2] G06F *3/02, 3/10, 3/14*
U.S. Cl. 364—900 5 Claims



1. A transcriber system for the computer-aided translation of shorthand notes in the form of outlines that are machine readable by the system into text, and the editing of said text, comprising:

shorthand machine means for generating said outlines,

determining means for locating word outlines in said outlines from said shorthand machine means,

means for translating said outlines from said determining means into text,

means for storing said outlines and corresponding text from said translating means,

display means for displaying said text from said translating means and said storage means, and

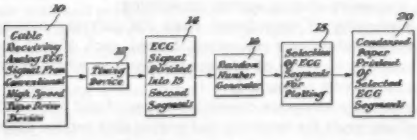
editor means coupled to said display means and said translator means for generating an electronic cursor to identify a text word to be edited, and for modifying said identified word, said cursor selectively conforming for an identified text word to the word boundaries determined by said translator means.

4,041,468

METHOD AND SYSTEM FOR ANALYSIS OF AMBULATORY ELECTROCARDIOGRAPHIC TAPE RECORDINGS

John H. Perry, Silver Spring, Md.; David S. Salsburg, New London, and Colin R. Taylor, Waterford, both of Conn., assignors to Pfizer Inc., New York, N.Y.

Filed Oct. 7, 1976, Ser. No. 730,628
Int. Cl.[2] G06F *3/12*
U.S. Cl. 364—900 10 Claims



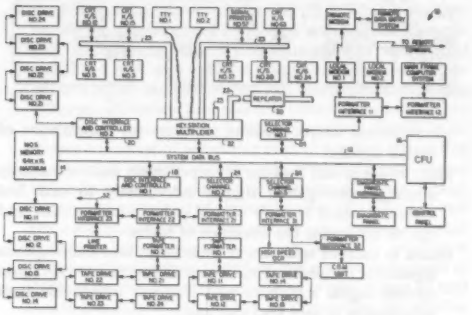
1. A method for rapidly analyzing an electrocardiographic tape recording comprising the steps of generating and receiving an analog ECG signal from a tape reading device, applying a timing signal to the analog ECG signal to provide an ECG signal divided into segments of predetermined relatively short duration of time, selecting a random number of predetermined time segments constituting a relatively small percentage of the tape recording and plotting the selected segments for visual analysis.

4,041,469

CRT KEY STATION WHICH IS RESPONSIVE TO CENTRALIZED CONTROL

Alan K. Jennings, Anaheim, Calif., assignor to Pertec Corporation, Los Angeles, Calif.

Filed Dec. 13, 1974, Ser. No. 532,714
Int. Cl.[2] G06F *3/02, 3/04*
U.S. Cl. 364—900 12 Claims



1. A peripheral processing system comprising a central processing system including a random access memory storing program information and a central processing unit operating in response to both stored program information and a data signal indicative of actuation of keyboard key to generate key station command information; the peripheral processing system further comprising a key station connected for communication with the central processing system, the key station including:

a keyboard having a plurality of manually actuatable keys;

an information output circuit connected to generate the data signal which is an indication of the actuation of a keyboard key, said signal including information indicative of the particular key that has been actuated, and to communicate the data signal to the central processing system;

an information input circuit connected to receive the key station command information generated by the central processing unit, said key station command information including information for controlling the operation of the key station with respect to keyboard entry of information by an operator; and

control circuitry connected to execute a key station function relating to entry of information through the keyboard by an operator in response to the key station command information received by the information input circuit.

4,041,470

FAULT MONITORING AND REPORTING SYSTEM FOR TRAINS

Francis L. Slane, Lancaster, and Truman L. Allison, York, both of Pa., assignors to Industrial Solid State Controls, Inc., York, Pa.

Filed Jan. 16, 1976, Ser. No. 649,678
Int. Cl.[2] B60L *3/00*; G06F *3/04, 11/06, 15/50*
U.S. Cl. 364—900 8 Claims

1. A monitoring and reporting system for use on a vehicle having a plurality of interconnected cars including a lead car and at least one other car, comprising

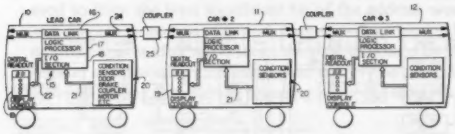
sensor means in each of said cars for monitoring a plurality of physical conditions in said cars and for altering circuit

conditions to represent the state of said physical conditions;

means in each of said cars connected to said sensor means in the same car for repetitively and sequentially detecting each of said circuit conditions and for producing a digitial signal having a value representative of the state of each physical condition;

means in each of said cars for evaluating said digital signals in accordance with predetermined criteria to produce and repetitively update a set of second digital signals having values representative of the existence or nonexistence of faults in said physical conditions;

first memory means in each of said cars for storing said set of second digital signals;



circuit means interconnecting said cars for transmission of digital signals;

logic means in said lead car for repetitively and sequentially sending interrogation signals individually to said first memory means in each of said cars, including said lead car, to determine the existence of faults;

means in each of said cars responsive to said interrogation signals for transmitting status signals representative of said second digital signals to said lead car to provide fault information to said lead car; and

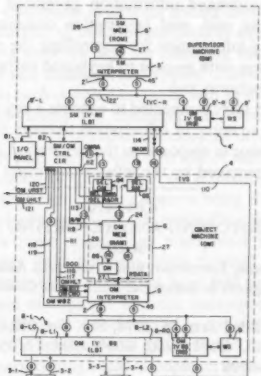
display means in said lead car for receiving and storing said status signals and for providing a visual display of fault conditions reported in said status signals.

4,041,471

DATA PROCESSING SYSTEM INCLUDING A PLURALITY OF PROGRAMMED MACHINES AND PARTICULARLY INCLUDING A SUPERVISOR MACHINE AND AN OBJECT MACHINE

Kenneth D. Krossa, and Douglas B. Earl, both of Los Altos, Calif., assignors to Scientific Micro Systems, Inc., Mountain View, Calif.

Filed Apr. 14, 1975, Ser. No. 567,717
Int. Cl.[2] G06F *15/16*
U.S. Cl. 364—200 **17 Claims**



1. A data processing apparatus comprising first and second programmed data processing machines wherein each data processing machine includes,

buffer means for storing operands,

memory means for storing a program of instructions,

interpreter means including means connected to said memory means for sequentially fetching instructions from said memory means, means for executing fetched instructions, and means connected to said buffer means for fetching and storing operands from and to said buffer means in the execution of instructions,

and wherein said buffer means includes a plurality of buffer stores wherein each of said buffer stores includes,

a plurality of latches for storing input signals for a digital device and for storing output signals for a digital device where said input and output signals are said operands,

device bus connection means for connecting a digital device to said latches,

interpreter bus connection means for connecting said interpreter means to said latches,

device enable means for enabling said device bus connection means to connect information into or out from said latches,

interpreter enable means, including an enable latch, for enabling said interpreter bus connection means to connect information into or out from said latches,

address detector means connected to said interpreter bus connection means and operative to enable said enable latch in response to a unique address and to disable said enable latch in response to all other addresses,

and wherein said data processing apparatus further includes

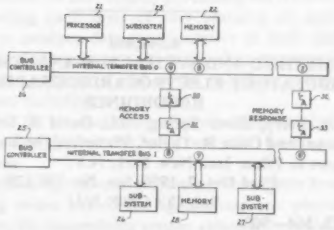
control circuit means responsive to operands from said buffer means of said first data processing machine formed as a result of executing instructions in said first data processing machine for halting and starting said second data processing machine from and means for transferring instructions from said first data processing machine to said second data processing machine for execution in said second data processing machine.

4,041,472

DATA PROCESSING INTERNAL COMMUNICATIONS SYSTEM HAVING PLURAL TIME-SHARED INTERCOMMUNICATION BUSES AND INTER-BUS COMMUNICATION MEANS

Niranjan S. Shah, and James F. Taylor, both of Escondido, Calif., assignors to NCR Corporation, Dayton, Ohio

Filed Apr. 29, 1976, Ser. No. 681,363
Int. Cl.[2] G06F *3/04, 13/00*
U.S. Cl. 364—900 **4 Claims**



1. In a data processing system having a plurality of subsystems, a memory-sharing system comprising:

a. a plurality of time-shared buses for carrying messages among subsystems connected thereto, each of said buses having a plurality of addressable ports to which subsystems may be connected;

b. a memory subsystem connected to one of said buses at one of said ports for receiving and storing data and for supplying data in response to requests therefor;

c. a requesting subsystem, connected to another of said buses at one of said ports, having means to generate a request

message for memory, said request message including a message destination address and a message source address;

d. a first inter-bus communication means connected to said one bus and to said other of said buses at a port on each bus, said inter-bus communication means responsive to the receipt of a message from said requesting subsystem for changing the destination address of said request message to direct said request message to the port on said one bus to which said memory is connected;

e. said memory responsive to a request message received from said first inter-bus communication means requesting data for supplying said data and forming a response message, including a destination address the same as the source address of the request message received from said first inter-bus communication means;

f. a second inter-bus communication means connected to said one bus and said other of said buses at a port on each bus, said second inter-bus communication means responsive to the response message of said memory for transmitting said response message from said one bus to the other of said buses; and

g. said first and second inter-bus communication means each including a first adapter having an input buffer for receiving messages from said one bus and an output buffer for placing messages on said one bus, and a second adapter having an input buffer for receiving messages from said other bus and an output buffer for placing messages on said other bus, and a cable means connecting said first and second adapters with the output buffer of one connected to receive messages from the input buffer of the other, all messages and data transmitted from one bus to the other bus being transmitted through the input and output buffers of said first or second inter-bus communication means.

4,041,473

COMPUTER INPUT/OUTPUT CONTROL APPARATUS

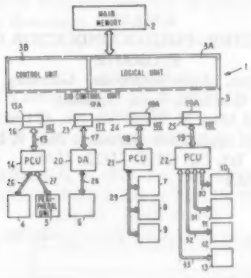
Angelo Bardotti, Cesano Boscone (Milan), and Renzo Pederzini, Melegnano (Milan), both of Italy, assignors to Honeywell Information Systems Italia, Minneapolis, Minn.

Filed May 12, 1975, Ser. No. 576,523

Claims priority, application Italy, May 16, 1974, 22812/74

Int. Cl.² G06F *3/00*

U.S. Cl. 364—900 **10 Claims**



1. In a digital computer system comprising a central processor, a first peripheral unit controlled by a peripheral control unit, and a second peripheral unit, the improved interface for providing for said central processor simultaneously to communicate with said peripheral control unit and to control directly and communicate with said second peripheral unit comprising:

first interface apparatus comprising a first universal port and a first module removably connectable to said first port and comprising a first circuit group and a first set of lines coupling said first circuit group to said peripheral control unit, said first circuit group for receiving control signals and data signals from said first port and from said peripheral control unit and in response to said signals received thereby transmitting appropriate and corresponding control and data signals to said first port and to said peripheral control unit; and

second interface apparatus comprising a second universal port and a second module removably connectable to said second port and comprising a second circuit group and a second set of lines coupling said second circuit group to said second peripheral unit, said second circuit group for receiving control signals and data signals from said second port and from said second peripheral unit and in response to said signals received thereby transmitting appropriate and corresponding control and data signals to said second port and to said second peripheral unit; wherein said first circuit group includes first control means for responding to a first plurality of control signals received from said peripheral control unit and for transmitting a second plurality of control signals to said peripheral control unit, said second circuit group includes second control means for responding to a third plurality of control signals received from said second peripheral unit and for transmitting a fourth plurality of control signals to said second peripheral unit, said first and third pluralities being different in number and said second and fourth pluralities being different in number; and said first control means transmits a subset of said second plurality of control signals in response to receipt of respective ones of a subset of said first plurality of control signals, said second control means transmits a subset of said fourth plurality of control signals in response to receipt of respective ones of a subset of said third plurality, said first and second circuit groups further including timing means for controlling the respective duration of said subset of said second plurality of signals to differ from the respective durations of said subset of said fourth plurality of signals, and for controlling the relative timing among the signals of said subset of said second plurality of signals to differ from the relative timing among said subset of said fourth plurality of signals; and

wherein said first and second universal ports are identical, each of said ports comprising an equal number of lines coupled to said central processor for transmitting control signals and data signals between said central processor and the one of said modules coupled to said port.

4,041,474

MEMORY MATRIX CONTROLLER

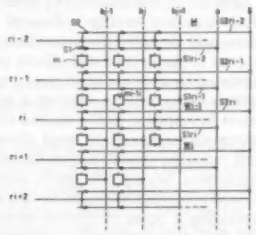
Claude Jan Principe Frederik Le Can, Nijmegen, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 512,684, Oct. 7, 1974. This application Jan. 30, 1976, Ser. No. 653,923

Claims priority, application Netherlands, Oct. 11, 1973, 7313983

Int. Cl.² G11C *11/40*

U.S. Cl. 340—173 R **1 Claim**



1. A memory storage device, comprising a plurality of memory elements organized as a matrix of rows and columns, ech of said rows including at least one marked memory element associated therewith;

first selection means having a first terminal associated therewith for selection of a first predetermined one of said rows;

second selection means, having a second terminal associated therewith for selection of a second predetermined one of said rows;

control means comprising first and second signal lines coupled with said respective first and second terminals, and a logical component for supplying a control signal to said first and second selection means, said control signal being applied to said first terminal and the complement of said control signal being supplied to said second terminal; and

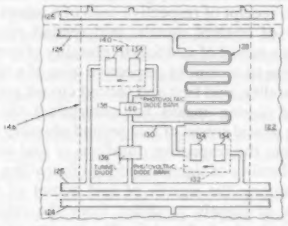
means for activating said control means, by means of a single predetermined instruction, comprising a central processor having a plurality of control lines, including a control line, activated by an increment instruction executed by said central processor, connected to said control means.

4,041,475

COMPUTER MEMORY

Ali Javan, Cambridge, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed July 16, 1975, Ser. No. 596,208
Int. Cl.² G11C *11/34*
U.S. Cl. 340—173 LS **5 Claims**



1. In a memory system having an assembly of memory cells with identifying address values, each cell capable of assuming alternatively either of two states, the states defining the value of information stored in the cell, the improvement comprising in combination

an array of memory cells spatially arranged on a substrate in accordance with identifying address values, each cell comprising

electrical circuitry having two alternative stable states, and

input-output means, connected to said circuitry, said means being responsive to incident optical radiation having two distinct alternative characterizations and producing two alternative electrical effects in correspondence thereto, said means being reponsive to the operating state of said circuitry to emit radiation indicating the operating state of said circuitry,

said circuitry being arranged and connected so that when said input-output means is stimulated by directionally-controlled optical radiation having a first of said distinct charcterizations said circuitry assumes a first of said stable states in response to the first of said effects and when said means is stimulated by optical radiation of a second of said characterizations said circuitry assumes a second of said operating states in response to the second of said effects,

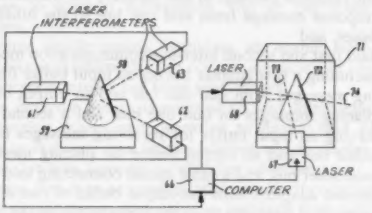
a radiation processor arranged to send directionallycontrolled optical radiation to and receive radiation from said array, said processor having data input, data output, and adress input, said processor arranged to operate in a write-in mode generating a beam of optical radiation directed selectively to the one of said cells corresponding to the value of an addressing signal received on said address input, the radiation of said beam having two distinctive alternative characterizations corresponding to the value of a data signal received on said data input, said processor including a radiation receiver arranged to operate in a read-out mode responding selectively to radiation from the one of said cells corresponding to the value of an addressing signal received on said address input and to emit on said data output an electrical signal of value corresponding to the characterization of the received radiation, said radiation processor including a lens system focussing optical radiation on a selected one of said cells, and said array being supported on a surface of a lens of said lens system.

4,041,476

METHOD, MEDIUM AND APPARATUS FOR PRODUCING THREE-DIMENSIONAL FIGURE PRODUCT

Wyn Kelly Swainson, P.O. Box 4262, Berkeley, Calif. 94704

Continuation-in-part of Ser. No. 744,027, July 11, 1968, abandoned. This application July 23, 1971, Ser. No. 165,042
Int. Cl.² G11C *13/04*
U.S. Cl. 340—173 CC **72 Claims**



1. A method of generating a three-dimensional pattern in a volume of material comprising the steps of:

a. generating control signals specifying the coordinate positions of a plurality of points within a volume of material which is capable of undergoing a change in optical properties in response to energy level changes within said volume, and

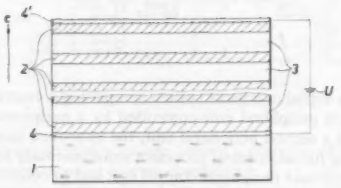
b. generating in response to said control signals energy level changes which cooperate within said volume at selected locations therein corresponding to said coordinate positions to produce the simultaneous visual display of said plurality of points.

4,041,477

FERROELECTRIC-PHOTOCONDUCTOR OPTICAL STORAGE

Jurgen Drenckhan, Jena-Neulobeda, Germany, assignor to Jenoptik Jena G.m.b.H., Jena, Germany

Filed Mar. 29, 1976, Ser. No. 671,601
Claims priority, application Germany, June 9, 1975, 186521
Int. Cl.² G11C *11/22, 11/42*
U.S. Cl. 340—173.2 **1 Claim**



1. A ferroelectric photoconductor optical storage comprising

a pair of transmissive electrodes

a sandwich parcel constituted of an alternating arrangement of ferroelectric layers and photoconductive layers,

said pair of transmissive electrodes enclosing said sandwich parcel and being oppositely located relative to

photoconductive layers out of said alternating arrangement,

said ferroelectric layers being selected from bismuth titanate.

4,041,478
MEMORY DEVICE

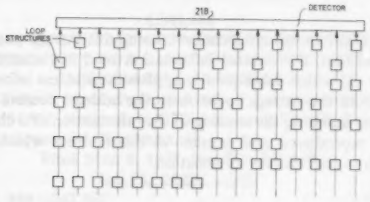
Adrianus Wilhelmus Maria van den Enden; Franciscus Antonius Kuipers; Edmond de Niet, and Willem Frederik Druyvesteyn, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 23, 1975, Ser. No. 625,024

Claims priority, application Netherlands, Oct. 31, 1974, 7414216

Int. Cl.[2] G11C *11/02*

U.S. Cl. 340—174 TF **8 Claims**



1. A memory device comprising

a plate of magnetic material capable of maintaining magnetic domains therein;

a domain guide structure in said plate for guiding the transport of said magnetic domains therein, comprising a plurality of discrete elements including a domain generating device, an input structure connected to said generating device, a storage structure connected to said input structure, and an output structure connected to said storage structure, and including loop structures displaced over discrete portions of said output structure for selectively controlling the transport of a magnetic domain from a first position to a second position on a predetermined one of said loop structures under control of at least two external rotary magnetic field sequences of different duration which distinguish each of said output structures by synchronization with the presence of magnetic domains on said loop structures.

4,041,479
OUTPUT CIRCUIT OF AN IONIZATION SMOKE SENSOR

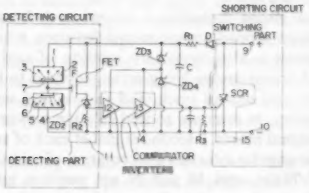
Atsushi Miyabe, Tokyo, Japan, assignor to Hochiki Corporation, Japan

Filed Feb. 9, 1976, Ser. No. 656,701

Claims priority, application Japan, Feb. 10, 1975, 50-17774[U]

Int. Cl.[2] G08B *21/00*

U.S. Cl. 340—237 S **4 Claims**



1. A high impedance circuit arrangement having ionization smoke sensors, comprising the ionization smoke sensor which has a high impedance and which is included in each of a plurality of alarm circuits connected to a common d.c. power source and being independent of one another, a power source shorting circuit which is so formed that a thyristor adapted to short-circuit said power source when triggered is connected in parallel with the corresponding ionization smoke sensor, said each shorting circuit including a relay which is energized by a current increased when said power source is shortcircuited and which serves to actuate peripheral means, a detecting circuit which is so formed that a semiconductor element adapted to current-amplify an impedance change of the corresponding ionization smoke sensor is connected in parallel with said ionization smoke sensor under the state of parallel connection to the corresponding shorting circuit, and a trigger circuit which is connected between an output end of the corresponding detecting circuit and a gate of the corresponding thyristor and which has a pair of inverters connected in a complementary relationship, whereby said pair of inverters hold the corresponding trigger circuit "off" in response to an output from the corresponding detecting circuit as is smaller than an operating voltage of said inverters, while they transmit a normalized voltage from said trigger circuit to the gate of the corresponding thyristor to turn said thyristor "on" and to close the corresponding shorting circuit in response to an output not smaller than said operating voltage.

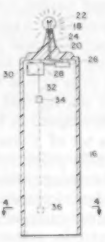
4,041,480
DISPENSER COVER AND INDICATOR

James Boyle, 358 Maple Glen Ridge, Pomona, N.Y. 10970

Filed Mar. 17, 1976, Ser. No. 667,571

Int. Cl.[2] G08B *21/00*

U.S. Cl. 340—280 **3 Claims**



1. An indicating device for a cup dispenser comprising:

a. a cover adapted to enclose a cup dispenser containing a plurality of vertically stacked removable cups therein;

b. sensing means secured within said cover to an upper surface for sensing the distance between the uppermost cup and a lower reference point,

c. indicator means secured to said cover to indicate when said uppermost cup reaches said lower reference point; and

d. switching means actuated by said sensing means to switch on said indicator means when said uppermost cup reaches said reference point, said sensing means including a spring controlled reel, a length of wire wound on said reel, a weight secured to the end of said wire, said weight being adapted to rest on said uppermost cup and move with said uppermost cup to pull said wire from said reel as said uppermost cup moves down said stack, and means for actuating said switching means when said length of wire and weight reach said reference point, said reel rewinding said wire when said weight is lifted above said reference point to deactivate said switching means and turn off said indicator means.

4,041,481
SCANNING APPARATUS FOR AN ELECTROPHORETIC MATRIX DISPLAY PANEL

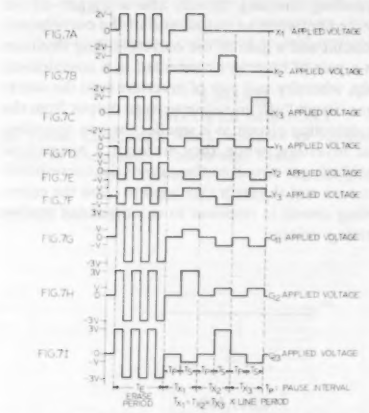
Teruo Sato, Kyoto, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Japan

Filed Oct. 1, 1975, Ser. No. 618,681

Claims priority, application Japan, Oct. 5, 1974, 49-114903; Oct. 5, 1974, 49-114905

Int. Cl.[2] G06K *15/18*; G02F *1/13*

U.S. Cl. 340—324 M **3 Claims**



1. A scanning apparatus for an electrophoretic matrix display panel having opposed spaced X-line and Y-line electrodes and having a multiplicity of display cells located between said X-line and Y-line electrodes, said scanning apparatus comprising an X-line electrode driving circuit adapted to be coupled to said X-line electrodes and having a set of X-line drivers for supplying an X-erasing pulse and a selecting pulse with a pause interval to an X-line electrode, said pause interval being supplied before said selecting pulse is supplied and after said X-erasing pulse is supplied so as to stop the supply of any voltage to said X-line electrode during said pause interval; a Y-line electrode driving circuit adapted to be coupled to said Y-line electrodes and having a set of Y-line drivers for supplying a Y-erasing pulse and a data pulse with a pause interval to a Y-line electrode, said Y-erasing pulse, pause interval and data pulse supplied to said Y-line electrode being synchronized with said X-erasing pulse, pause interval and selecting pulse supplied to said X-line electrode, respectively, so as to stop the supply of any voltage to the display cell at the intersection of said X-line electrode and said Y-line electrode during said pause interval, the voltage difference between said selecting pulse and said data pulse being applied as an information pulse to said display cell; and an information signal supply means coupled to said X-line and Y-line electrode driving circuits.

4,041,482
CHARACTER GENERATOR FOR THE REPRODUCTION OF CHARACTERS

Jurgen Freudeberg, and Reimer Von Osten, both of Eiserfeld, Germany, assignors to U.S. Philips Corporation, New York, N.Y.

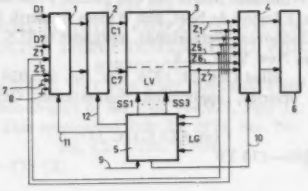
Filed Mar. 11, 1976, Ser. No. 665,955

Claims priority, application Germany, Mar. 25, 1975, 2513059

Int. Cl.[2] G06F *3/14*

U.S. Cl. 340—324 AD **5 Claims**

1. A character generator for generating the signals for a reproduction device for the reproduction of characters composed of a matrix of dots, comprising a store which is addressed by an address control system and which contains in each addressed storage location at least a part of the information for generating the signals for a character assigned to this address, characterized in that for any desired character form the store (3) comprises a storage location containing the associated complete character information, and a storage location assigned to a character which can be reproduced in respective different forms containing address information, each storage location further including at least one storage position for control information which indicates whether the storage location contains address information or character information,



any access to a storage location causing this storage position to be read first, the control information read out controlling a switch (1) which subsequently applies the address information read from the storage location to the address control system (2), thus initiating the reading of the information of a character to be reproduced and present at this address which corresponds to the address information.

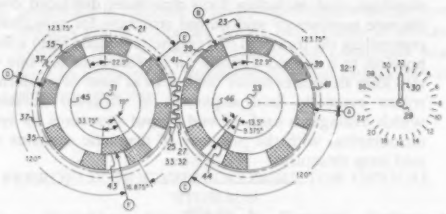
4,041,483
ABSOLUTE INCREMENTAL HYBRID SHAFT POSITION ENCODER

Alvin H. Groff, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Apr. 18, 1975, Ser. No. 569,414

Int. Cl.[2] H03K *13/02*; G01D *5/34*

U.S. Cl. 340—347 P **11 Claims**



1. Shaft position encoder means comprising:

a. first means including a first coded track and an associated first sensor means between which relative movement is caused by rotation of said shaft, said first sensor means being arranged so as to be sensitive only to said first track, and said first sensor means generating, in response to said relative movement within said first means, a first signal at each of substantially regular angular intervals α of rotation of said shaft.

b. second means including a second coded track and an associated second sensor means between which relative movement is also caused by rotation of said shaft, said second sensor means being arranged so as to be sensitive only to said second track, and said second sensor means generating, in response to said relative movement within said second means, a second signal at each of substantially regular angular intervals β of rotation of said shaft, where $\beta = M/N \times \alpha$, and M and N are positive intergers >1 which contain no prime factor, other than the prime number one, which is common to both, and

c. third means including a third coded track and an associated third sensor means between which relative movement is also caused by rotation of said shaft, said third sensor means being arranged so as to be sensitive only to

said third track, and said third sensor means generating, in response to said relative movement within said third means, a voltage or current transition at each of substantially regular angular intervals $\beta/M/k$ of rotation of said shaft where k is a positive integer,

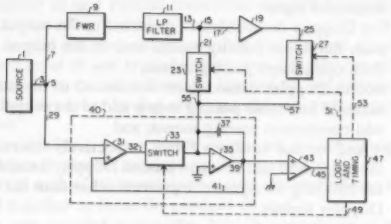
whereby for a predetermined direction and amount of shaft rotation each positionally different first signal has associated therewith a corresponding and identifying electrical signature comprising a predetermined number of said transitions occurring between the associated first signal and the second signal last occurring prior to the associated first signal, each said electrical signature being different from all the other electrical signatures within said predetermined amount of shaft rotation in that each said electrical signature comprises a different number of said transitions.

4,041,484

ANALOG-TO-DIGITAL CONVERTER USING COMMON CIRCUITRY FOR SAMPLE-AND-HOLD AND INTEGRATING FUNCTIONS

Alberto Boleda, Menlo Park, and Robert J. Tracey, San Mateo, both of Calif., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Mar. 6, 1975, Ser. No. 556,048
Int. Cl.[2] H03K *13/02*
U.S. Cl. 340—347 NT **2 Claims**



1. A circuit arrangement for converting a time-varying or *d-c* signal into a digital representation which comprises:

timing means;

logic means;

first switching means;

reference voltage means comprising:

a full-wave rectifier connected to receive the analog signal; and

a low pass filter connected to the output of the full-wave rectifier to reduce the ripple and harmonic voltages generated during rectification; and means for connecting the reference voltage output from said filter means to said first switching means;

means for generating a ramp signal comprising:

combined sampling, holding and integrating means for timed selection of samples of said signal at intervals set by said timing means, said logic means controlling the connection of said reference voltage via said first switching means to said combined sampling, holding and integrating means; said generating means further comprising:

a first operational amplifier having an inverting input connected to receive the signal, a non-inverting input, and an output;

second switching means having one end connected to the output of said first operational amplifier; and

a second operational amplifier having an inverting input connected to the other end of said first and second switching means; having a non-inverting input connected to ground, and having a capacitor connected between the inverting input and the output; and a feedback means connected between the output of said operational amplifier and the non-inverting input of said first operational amplifier;

means for comparing said ramp signal to ground; and

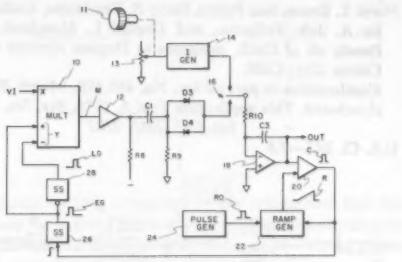
means for counting the time duration of the ramp signal for durations less than a predetermined period.

4,041,485

SPLIT GATE TRACKER USING BIPOLAR CONVERTER

Howard R. Stevenson, Jr., Herkimer, N.Y., assignor to General Electric Company, Utica, N.Y.

Filed Dec. 17, 1975, Ser. No. 641,458
Int. Cl.[2] G01S *9/16*
U.S. Cl. 343—7.3 **5 Claims**



1. A split gate pulse tracking circuit comprising, in combination:

a multiplier having first and second input ports and an output port;

means for applying a video signal containing a pulse to be tracked to said first input port;

means for generating sequential and contiguous early and late gate sampling pulses and for applying said pulses to said second input port, said sampling pulses being received by said multiplier in opposite polarity states such that the output produced by said multiplier coincident with said sampling pulses is a bipolar representation of a portion of said video signal;

integrating means connected to said output port for integrating the multiplier output signal; and

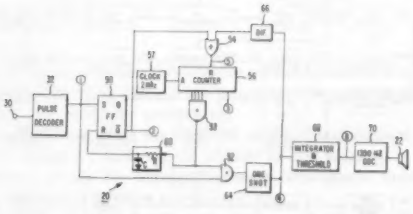
means responsive to changes in the output of said integrating means for shifting the timing of said early and late gate pulses.

4,041,486

PULSE STREAM IDENTIFICATION CIRCUIT

Mohammed Imam Hussain, Los Angeles, Calif., assignor to RCA Corporation, New York, N.Y.

Filed Nov. 10, 1975, Ser. No. 630,730
Int. Cl.[2] G01S *9/02*
U.S. Cl. 343—7.3 **6 Claims**



1. In a system for identifying a stream of uniformly spaced pulses at a fixed period T from a stream of randomly spaced

pulses separated in time from the uniformly spaced pulses, in combination:

means responsive to at least each pulse of said uniformly spaced pulses for producing an interrogation pulse at the fixed time, T, of the next expected uniformly spaced pulse;

means responsive to the concurrent presence of said interrogation pulse and a pulse of said streams of pulses for producing a concurrence signal; and

means responsive to the presence of a predetermined number of concurrence signals corresponding to successive uniformly spaced pulses for producing a signal indication that uniformly spaced pulses are present.

4,041,487

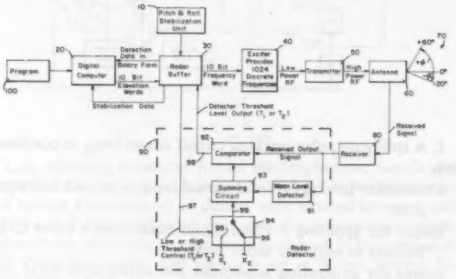
LOW ELEVATION ANGLE RADAR TRACKING SYSTEM

Norol T. Evans, San Pedro; Barry S. Pearlstein, Anaheim; Merlin A. Job, Fullerton, and Donald L. Hoagland, Newport Beach, all of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Continuation-in-part of Ser. No. 455,698, March 25, 1974, abandoned. This application Feb. 3, 1976, Ser. No. 654,822

Int. Cl.[2] G01S *9/02*

U.S. Cl. 343—7.5 **19 Claims**



14. A method for controlling of threshold levels and hence the required signal levels of a pair of sequentially switched radar beams of a radar system having a buffer circuit, comprising the steps of:

switching, in a predetermined time sequence, the threshold levels;

comparing the switched threshold levels with signals received by the system; and

feeding the compared signals to the buffer circuit.

4,041,488

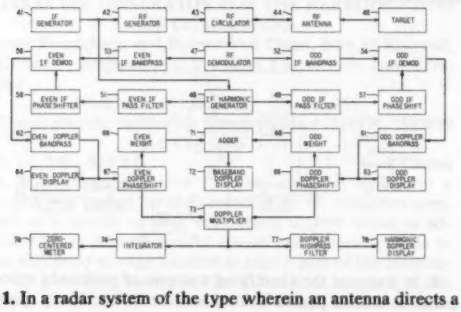
DOPPLER RADAR SYSTEM

William Fishbein, Elberon, and Otto Rittenbach, Neptune, both of N.J., assignors to The United States of America as represented by the Department of the Army, Washington, D.C.

Filed Apr. 19, 1976, Ser. No. 677,948

Int. Cl.[2] G01S *9/50*

U.S. Cl. 343—8 **9 Claims**



1. In a radar system of the type wherein an antenna directs a beam of radio frequency energy at a target, said target reflecting a portion of said beam back towards said antenna, said system including:

means for generating said radio frequency energy; and

means for demodulating the beam portion reflected back by said target, the improvement which comprises:

means for generating a sinusoidal signal of a first frequency;

means for frequency- or phase-modulating said radio frequency generating means with said sinusoidal signal;

means for generating odd and even harmonics of said sinusoidal signal of a first frequency;

means, connected to the output of said demodulating means and to the output of said harmonic generating means, for developing phase-quadrature Doppler signals from said reflected beam portion; and

said Doppler signal developing means including:

means, connected to the output of said harmonic generating means, for passing at least one of the even harmonics of said sinusoidal signal;

means, connected to the output of said harmonic generating means, for passing at least one of the odd harmonics of said sinusoidal signal;

means, connected to the output of said demodulating means, for passing components of the reflected beam portion centered about said at least one even harmonic of said sinusoidal signal;

means, connected to the output of said demodulating means, for passing components of the reflected beam portion centered about said at least one odd harmonic of said sinusoidal signal;

a first Doppler demodulator connected to the output of said even harmonic passing means and to the output of said even component passing means;

a second Doppler demodulator connected to the output of said odd harmonic passing means and to the output of said odd component passing means; and

first and second bandpass filters respectively connected to the outputs of said first and second Doppler demodulators for blocking all signal components other than the desired Doppler signals.

4,041,489

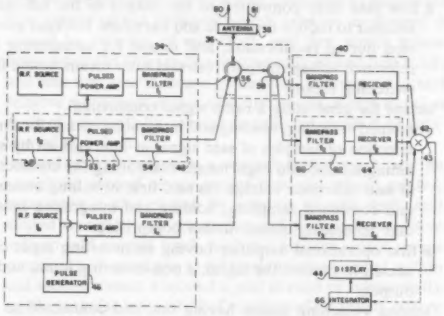
SEA CLUTTER REDUCTION TECHNIQUE

Bernard L. Lewis, Oxon Hill, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 25, 1974, Ser. No. 482,970

Int. Cl.[2] G01S *7/28*

U.S. Cl. 343—17.1 R **3 Claims**



1. A radar system comprising:

a radar transmitter for generating a multi-frequency radar pulse, said pulse having at least two discrete carrier frequency components;

radar antenna means for radiating said radar pulse and for receiving the return radar signal;

first coupling means for coupling said transmitter means to said antenna means whereby the energy of said pulse is directed only to said antenna means;

a radar receiver for receiving and separately simultaneously processing each of said carrier frequency components of said return signal;

second coupling means for coupling said antenna means to said receiver means whereby the energy of said return radar signal is directed only to said receiving means;

multiplying means connected to the output of said receiver for multiplying together the processed output of each frequency component; and

means connected to the output of said multiplying means for indicating the result of said multiplication whereby said receiving signals having only radar frequency energy within selected narrow frequency bands are detected in said radar receiver and constitute said processed output, and said processed outputs of each said frequency component are multiplied together in said multiplying means,

said radar transmitter comprising parallel transmitter branches, each of said branches being capable of generating an output radar signal pulse of predetermined radar frequency energy, each said frequency dfferent from the frequency of the other of said branches, said branches being simultaneously operable to produce a multi-frequency radar pulse having at least two carrier frequency components,

said radar receiver connected to said second coupling means having parallel receiving branches, equal in number to the number of said parallel transmitter branches, and having corresponding receiving frequencies,

said second coupling means coupling the received signals to each input of said receiving branches whereby the energy of said return radar signal is directed to said parallel receiver branches having corresponding receiving frequencies,

said multiplying means being connected to the output of each said parallel receiver branch for combining the output of each of said receiving branches by multiplying them all together to form the product thereof,

each said parallel transmitter branch comprising a radar frequency generator, a pulsed power amplifier connected to said radar frequency generator for amplifying the output of said radar frequency generator, each said pulsed power amplifier being connected to a pulse generator whereby each pulsed power amplifier amplifies only during a period that it receives a pulse from said pulse generator, and bandpass filter connected to the output of said pulsed power amplifier, and

each said parallel receiver branch comprising a bandpass filter and a radar frequency receiver connected in series in the order recited and further wherein said receiver means includes a signal detection means.

4,041,490

MEASUREMENT SYSTEM CALIBRATED TO BE INSENSITIVE TO TEMPERATURE VARIATION INDUCED CHANGES IN INTERNAL PHASE SHIFTS PRESENT IN THE SYSTEM

Richard Edwin Watt, San Diego, Calif., assignor to Cubic Corporation, San Diego, Calif.

Filed June 25, 1976, Ser. No. 699,898
Int. Cl.[2] G01S 7/40
U.S. Cl. 343—17.7 **5 Claims**

1. A measurement system wherein a given quantity is determined by measuring the phase shift between a transmitted continuous wave signal from a transmitter and a continuous wave signal received by a receiver from a transponder in response to said transmitted signal, comprising

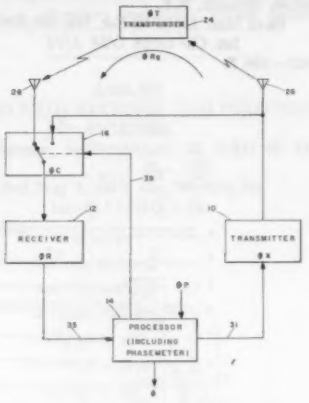
said transmitter,

said receiver, and

a digital phasemeter for measuring said phase shift and for providing a count representative thereof, and including

means for presetting the count therein to compensate for internal phase shifts in the measurement system,

wherein the improvement comprises



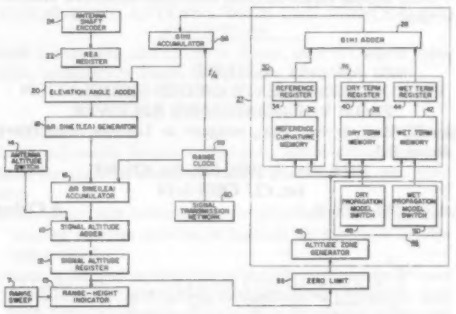
a calibration system connected to the transmitter and the receiver for making the measurement system insensitive to temperature variation induced changes in internal phase shifts present in the transmitter and the receiver.

4,041,491

METHOD AND APPARATUS FOR DETERMINING THE ALTITUDE OF A SIGNAL PROPAGATION PATH

John W. Taylor, Jr., and Carl A. McGrew, both of Baltimore, Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 14, 1975, Ser. No. 631,976
Int. Cl.[2] G01R 29/08
U.S. Cl. 343—100 R **37 Claims**



2. A signal processor for determining the altitude of a signal transmitted from an antenna and propagated through the atmosphere, said processor comprising:

means for encoding the elevation angle of said antenna;

first means for selecting the altitude of said antenna;

second means for selecting a model atmosphere through which said signal is propagated; and

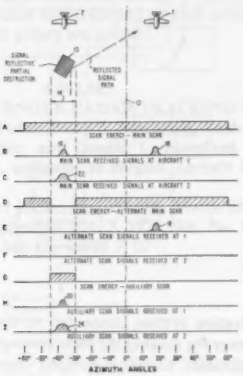
means for determining the propagation path of said signal in relation to said elevation angle, antenna altitude and model atmosphere.

4,041,492

RADIO NAVIGATION WITH SEPARATE CORRELATED SCANS TO AVOID REFLECTION INTERFERENCE

Donald J. Toman, Pleasantville, N.Y., assignor to Tull Aviation Corporation, Armonk, N.Y.

Filed Mar. 19, 1976, Ser. No. 668,696
Int. Cl.[2] G01S *1/54, 1/16*
U.S. Cl. 343—106 R 15 Claims



1. A method for providing navigation signals for aircraft over a full navigation angle sector in the presence of a signal-reflective fixed obstruction within a sub-sector of the navigation sector while avoiding the consequences of reflected signal interference therefrom, comprising

transmitting radio energy containing navigation information in a directional beam which is scanned in a main scan over said navigation sector.

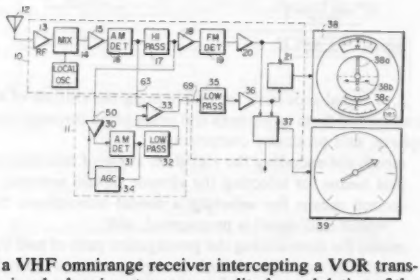
and separetly transmitting radio energy containing navigation information in a directional beam which is scanned in an auxiliary scan only over said obstruction sub-sector while transmitting auxiliary scan identifying information to distinguish the auxiliary scan from the main scan to thereby provide information sufficient for a receiver within said navigation sector to distinguish true signals from signals reflected from the signal reflective obstruction.

4,041,493

ELIMINATION OF EXTRANEOUS MODULATION FROM VHF OMNIRANGE RECEIVER

John G. Mast, Irving, Tex., assignor to Textron, Inc., Providence, R.I.

Filed Nov. 7, 1975, Ser. No. 629,968
Int. Cl.[2] G02S *1/44*
U.S. Cl. 343—106 R 9 Claims



1. In a VHF omnirange receiver intercepting a VOR transmission signal wherein extraneous amplitude modulation of the carrier occurs close to the frequency of a variable phase VOR modulation signal and a subcarrier is frequency modulated by a fixed phase signal at the frequecny of said variable phase signal, the combination which comprises:

a. means to detect amplitude modulation of said subcarrier,

b. means to amplify with phase reversal the detected modulation signal, the amplification being by an amount equal to the ratio of the carrier amplitude to the subcarrier amplitude to produce a cancellation signal, and

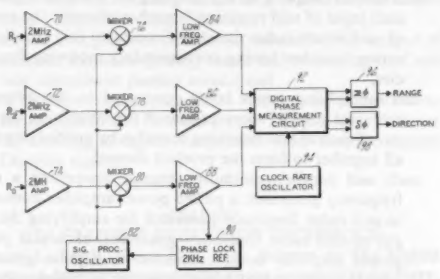
c. means for adding said cancellation signal to said transmission signal to eliminate the effects of said extraneous amplitude modulation at said frequency on said carrier.

4,041,494

DISTANCE MEASURING METHOD AND APPARATUS

Harold I. Ewen, Weston, and George G. Haroules, Lexington, both of Mass., assignors to The United States of America as represented by the Secretary of the Department of Transportation, Washington, D.C.

Filed Nov. 10, 1975, Ser. No. 630,161
Int. Cl.[2] G01S *3/02*
U.S. Cl. 343—112 D 9 Claims



1. A method for the measurement of distance comprising the steps of:

generating a carrier frequency signal;

generating a modulation signal;

employing the modulation and carrier signals to generate a first sideband signal at a frequency related to said carrier frequency;

simultaneously transmitting the carrier and first sideband signals;

receiving the transmitted carrier and sideband signals at three points linearly spatially displaced along a common baseline;

extracting the intermediate frequency from the carrier and sideband signals received at each point to thereby provide three intermediate frequency signals each having a different phase relationship commensurate with the respective distances between the point of transmission and points of reception;

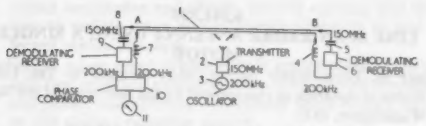
comparing the phase at said intermediate frequency of two pair of the three signals provided by extracting the intermediate frequency to obtain information corresponding to the differences in phase between the compared intermediate frequency signals of each pair; and

summing the phase differences at the intermediate frequency to provide a measure of the distance from the baseline to the point of transmission.

4,041,495
APPARATUS FOR DETERMINING THE POSITION OF AN OBJECT

David James Reginald Martin, Leatherhead, England, assignor to Coal Industry (Patents) Limited, London, England

Filed Sept. 4, 1975, Ser. No. 610,393
Claims priority, application United Kingdom, Oct. 4, 1974, 43129/74
Int. Cl.[2] G01S 3/02; G08B 21/00
U.S. Cl. 343—112 R 10 Claims

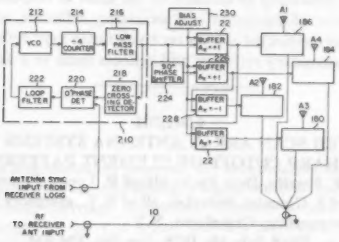


1. Apparatus for determining the position of an object along a fixed path in which the apparatus includes a receiving aerial line in or adjacent the path, a transmitter associated with the object and movable therewith, first demodulating means connected to one end of the line and arranged to feed a demodulated signal into the line, second demodulating means connected to the other end of the line, and phase comparator means connected to the said other end of the line to receive demodulated signals from the first demodulating means and also connected to receive demodulated signals form the second demodulating means, the demodulating means and phase comparator means being responsive to transmitter signals and further adapted to determine the phase difference of the demodulated signals received and to give an output signal indicative of the phase difference, which is related to position of an object.

4,041,496
AUTOMATIC DIRECTION FINDING SYSTEM

Paul R. Norris, P.O. Box 925, Issaquah, Wash. 98027

Filed Apr. 26, 1976, Ser. No. 680,203
Int. Cl.[2] G01S 5/02
U.S. Cl. 343—113 DE 21 Claims



1. An automatic direction finding system for indicating the bearing of a radio transmission, comprising:

an antenna array including at least three non-unidirectional antenna elements circumferentially spaced along a circular path;

antenna control means for simultaneously varying the coupling from each of said antenna elements to an antenna output line, said control means being continuously adjustable within a predetermined coupling range in accordance with respective antenna coupling signals such that said antenna array effectively simulates a single antenna element moving along a circular path at a frequency corresponding to the frequency of said coupling signals.

signal generating means for producing said antenna coupling signals;

receiver means for extracting a doppler modulation signal from the signal at said antenna output line, said modulation signal having a frequency equal to the frequency of said coupling signals; and

direction indicating means for comparing the phase of said modulation signal to the phase of a coupling signal and for producing a direction indication signal proportional thereto.

4,041,497
HEADBAND WITH RECEIVER AND DIRECTIONAL ANTENNA

Tore Georg Palmaer, Smultronvagen 28, S-331 00 Varnamo, Sweden

Filed May 5, 1975, Ser. No. 574,701
Int. Cl.[2] H01Q 1/24
U.S. Cl. 343—702 1 Claim

1. In combination with a portable radio receiver, a housing for enclosing said receiver, a headband for supporting said housing along one side of the head of a user, said headband and housing defining a plane of symmetry coincident with the lateral plane of symmetry of the head of the user an antenna integrally mounted in said housing with said receiver, said antenna comprising a coil having a longitudinal axis, said coil being fixedly mounted with respect to said receiver at a rearwardly inclined angle of between 15° – 45° with respect to the plane of symmetry of the headband and receiver when worn in the normally geometric vertical position on the head.

4,041,498
COLLAPSIBLE ADJUSTABLE LENGTH CITIZENS-BAND ANTENNA WITH COIL CONCEALING STRUCTURE

Ronald J. Freimark, and Laszlo N. Repay, both of Chagrin Falls, Ohio, assignors to Tenna Corporation, Cleveland, Ohio

Filed May 27, 1976, Ser. No. 690,578
Int. Cl.[2] H01Q 9/18
U.S. Cl. 343—749 2 Claims

1. An adjustable length, collapsible, motor driven antenna suitable for use with so-called citizens-band transceivers, comprising:

inner, outer, and intermediate longitudinally movable telescoping antenna sections, at least all but the inner section being tubular;

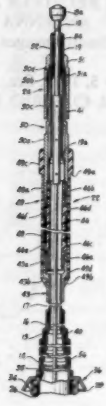
a support for said sections into which the sections are at least partially receivable when the antenna is collapsed, said support being elongated and having an opening at one end through which the sections pass when moved into and out of said support;

an electrically powered drive including motor and transmission secured to said support and a flexible cord extensible through at least all but the inner antenna section and driven by said motor and transmission, to extend and retract the antenna sections;

a loading coil carried by and electrically coupled with an intermediate section next adjacent to the inner section, said coil being around a tubular coil form secured at one end to said carrying section and having a collet secured to

the other end, the coil being electrically coupled with the carrying section and the collet;

a tubular antenna segment shorter than said sections, coaxial with and of the same diameter as said carrying section, slidably secured within said collet and forming an extension of the carrying section and which when moved axially in the collet changes the length of the antenna beyond the coil; and



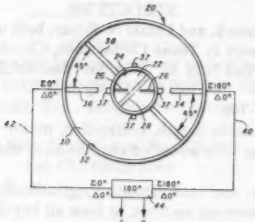
a cover sleeve over the tuning coil and coil form, said sleeve having a central portion of a diameter no greater than that of the outer movable telescoping section and receivable in said opening and support, and a portion at the opposite end of the sleeve tapered inwardly in a direction away from said central portion.

4,041,499

COAXIAL WAVEGUIDE ANTENNA

Charles Chung-Yeh Liu, Dallas, and James Alec Fuller, Richardson, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 7, 1975, Ser. No. 629,723
Int. Cl.[2] H01Q *13/06, 13/08*
U.S. Cl. 343—756 **7 Claims**



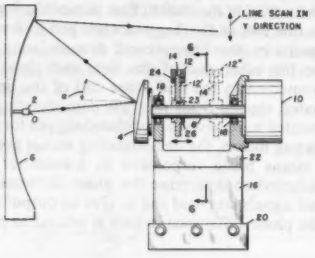
1. A coaxial waveguide horn antenna system comprising a source of electromagnetic monopulse signals, a hybrid circuit means coupled to the source of electromagnetic monopulse signals for producing sum and difference monopulse signals, said hybrid circuit means including first and second 180° hybrids, said first hybrid being connected to a source of power at a first selected frequency bandwidth for producing a sum signal, said second hybrid being connected to a source of power at a second selected frequency for producing a difference signal, and a coaxial waveguide horn antenna for radiating monopulse signals in sum and difference patterns, said coaxial waveguide horn antenna comprising first and second sections, said first section coupled to the first hybrid for radiating the sum signal in a sum pattern, and said second section coupled to the second hybrid for radiating the difference signal in a difference pattern, said first and second sections being formed by a plurality of spaced concentric cylindrical walls, the outer wall of the first section forming the inner wall of the second section, the inner wall of the second section having a circumference substantially equal to one wavelength of the lowest frequency of its bandwidth and the outer wall of the second section having a circumference substantially equal to two wavelengths of the lowest frequency of the bandwidth.

4,041,500

LINE SCAN RADAR ANTENNA USING A SINGLE MOTOR

Roger H. Lapp, Silver Spring, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 12, 1976, Ser. No. 685,866
Int. Cl.[2] H01Q *3/12, 19/18*
U.S. Cl. 343—761 **10 Claims**



1. A line scan radar antenna comprising:

a secondary reflector,

a motor,

a shaft coupling the motor to the secondary reflector, the axis of the shaft forming an angle α with the axis of symmetry of the secondary reflector,

means affixed to the shaft for translating the shaft in a direction transverse to the axis of the shaft in response to the rotation of the motor and secondary reflector, and

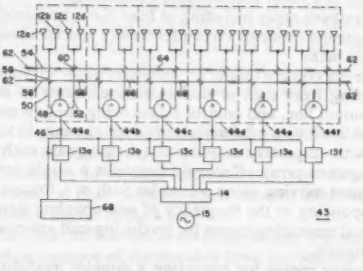
a primary reflector which receives radar rays reflected off the secondary reflector and reflects them in a line scan.

4,041,501

LIMITED SCAN ARRAY ANTENNA SYSTEMS WITH SHARP CUTOFF OF ELEMENT PATTERN

Richard F. Frazita, Deer Park; Alfred R. Lopez, Commack, and Richard J. Giannini, Setauket, all of N.Y., assignors to Hazeltine Corporation, Greenlawn, N.Y.

Filed July 10, 1975, Ser. No. 594,934
Int. Cl.[2] H01Q *3/26*
U.S. Cl. 343—844 **38 Claims**



1. An antenna system for radiating wave energy signals into

a selected angular region of space and in a desired radiation pattern comprising:

an aperture comprising a plurality of element groups, each group comprising two or more radiating elements;

a plurality of first coupling means, each for coupling supplied wave energy signals to the elements in a corresponding one of said element groups;

and second coupling means for interconnecting said plurality of first coupling means to cause wave energy signals supplied to any of said first coupling means to be additionally coupled to selected elements in substantially all of the remaining element groups of said aperture with predetermined amplitudes and phases, thereby causing said aperture to radiate wave energy signals primarily in said selected region of space;

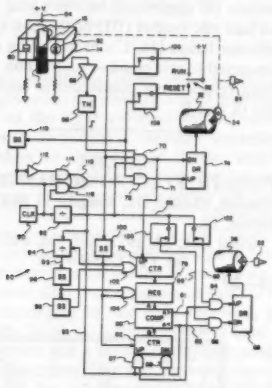
whereby when wave energy signals are supplied to each of said first coupling means with a predetermined amplitude and phase, said aperture will radiate wave energy signals in said desired radiation pattern.

4,041,502

SEDIMENTATION RECORDER

Raymond H. Williams, Chadwicks, and Emil J. Misiaszek, New York Mills, both of N.Y., assignors to Williams Tool, Inc., Chadwicks, N.Y.

Filed Dec. 22, 1975, Ser. No. 643,088
Int. Cl.[2] G01D *5/32, 9/30*
U.S. Cl. 346—33 A **6 Claims**



1. In a sedimentation recorder the combination comprising:

a transparent tube containing a liquid-solid mixture;

a movable carrriage supported adjacent to said tube and arranged to move in a path parallel thereto;

irradiation means arranged to direct a beam of radiation through said tube;

photodetection means mounted on said carriage in a position to detect said beam of radiation, said photodetection means being further adapted to generate an output signal indicating the intensity of said detected radiation;

a motor for driving said carriage;

a motor drive circuit;

a coincidence circuit having a first and second input and an output connected to said motor drive circuit;

a threshold circuit connected to receive said output signal from said photodetection means and adapted to feed a first contrOl signal to the first input of said coincidence circuit when said photodetector output exceeds a predetermined level;

means for supplying a second control signal to the second input of said coincidence circuit whereby the latter operates to energize said motor in response to outputs from said threshold circuit such that said carriage is caused to track the liquid-solid separation boundary within said tube; and

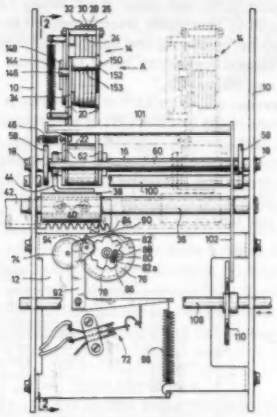
recording means for generating a record of the motion of said motor thus producing a record of the settling of the solids within said liquid-solid mixture.

4,041,503

ATTENDANCE TIME RECORDER

Wilfried Michel, Plochingen; Hartmut Reichert, and Erich Willmann, both of Esslingen, all of Germany, assignors to Simplex Time Recorder, Gardner, Mass.

Continuation of Ser. No. 556,850, March 10, 1975, abandoned. This application Oct. 7, 1976, Ser. No. 730,348
Claims priority, application Germany, Mar. 13, 1974, 2411975
Int. Cl.[2] G07C *1/06*
U.S. Cl. 346—83 **15 Claims**



1. In an in-and-out time recorder the combination comprising a printing device for printing clock times along the lines of a data medium; retaining means for holding the data medium adjacent the printing device; said printing device being slidably mounted for displacement substantially parallel to the lines of the data medium; said printing device comprising a plurality of adjacent number wheels provided with number print types for imprinting clock times onto the data medium; indexing means connected to said number wheels for indexing said number wheels; an electric motor for effecting displacement of the printing device relative to the retaining means; drive means coupling said electric motor to said printing device, and including a resilient coupling switch means for switching said electric motor on and off at the beginning and approximately at the end respectively of each displacement of said printing device, and positioning means positively coupled with the printing device in at least one direction of displacement of said printing device for positioning the same in predetermined positions relative to a line of the data medium.

4,041,504

PHOTOGRAPHIC EXPOSURE SETTING DEVICE

Vitautas Jurgio Iodvalkis, ulitsa Dzerzhinskogo, 9, Kv. 13; Richardas Prano Nomitsas, ulitsa Kestüche, 5, Kv. 2, both of Vilnjus; Anatoly Fedorovich Andreev, ulitsa Karpinskogo, 10, Kv. 35, and Vladimir Borisovich Grekov, Sinyavinskaya ulitsa, 16, Kv. 10, both of Leningrad, all of U.S.S.R.

Filed May 19, 1975, Ser. No. 579,071
Int. Cl.[2] G03B *7/08*
U.S. Cl. 354—23 R **3 Claims**

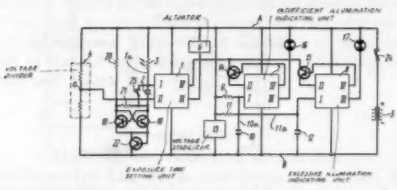
3. A photographic exposure setting device for a camera

having a shutter, the device comprising: a power source (5) having a positive and negative supply buses (A, B);

a. an exposure time setting unit (1) for a camera having a shutter, said exposure time setting unit having two inputs (I, II) and two outputs (III, IV); said unit (a) including a threshold amplifier (25) whose two inputs are connected to said inputs (I, II) of the unit (a); said amplifier including serially connected transistors (28 to 31) constituting a common-emitter circuit, the first transistor (28) operating in the linear mode, whereas the remaining transistors (29 to 31) operate in the switching mode; one input of said amplifier constitute one (I) of said inputs of the unit (a), being the base of said first transistor; another input of said amplifier, which forms another one (II) of said inputs of the unit (a), being linked to the interconnected emitters of two (29, 31) of said transitors, the output of said amplifier being linked to the collector of the last one (31) of said transistors;

b. means (26) for shifting the output voltage level of said amplifier (25), said means constituting a cascade of transistors (36 to 39) serially interconnected by way of their base - emitter junctions, the base of the first one (36) of said last-named transistors being connected to said output of the amplifier (25);

c. a current amplifier (27) whose input is connected to the emitter of the last one (39) of said transistors of the means (b), said current amplifier including serially interconnected transistors (42 to 45) constituting a common-emitter circuit and operating in the switching mode, one output of said current amplifier (27) being the collector of the last one (45) of its transistors, another output thereof being



the collector of one (43) of said transitors, both said last-named outputs constituting said outputs (III, IV) of the unit (a);

d. three integrating timing RC circuits (1*a*, 10*a*, 11*a*), leads of a first one (1*a*) of said circuits being connected to respective ones of said supply buses, whereas a center tap of said first circuit (1*a* in d) is connected to said one (I) input of the unit (a);

e. a voltage divider (4) whose leads are connected to respective ones of said supply buses, a center tap of said divider (e) being connected to said input (II) of the unit (a);

f. a voltage stabilizer (13) also connected to said positive supply bus via a ballast current-limiting resistor (66), said stabilizer (f) including at least two transistors (64, 65) that are serially interconnected via their base - emitter junctions;

g. a first transistor switch (14) having two inputs and one output, one of said inputs being connected to one (IV) of said outputs of the unit (a); said second circuit (10*a* in d) being connected to the output of said stabilizer (f) and to said negative supply bus;

h. an insufficient illumination indicating unit (7) having two inputs (I, II) and two outputs (III, IV), there being connected to one (I) of said inputs of the unit (b) the center tap of said second circuit (10*a* in d), whereas an output of said switch (g) is connected to the other (II) of said inputs of the unit (h); the latter including a threshold current amplifier including serially interconnected transistors (48 to 50) constituting a common-emitter circuit and operating in the switching mode; one input of said threshold current amplifier, which forms said one input (I) of the unit (h), being the base of the first one (48) of said transistors, the other input of said threshold current amplifier, which forms said other input (II) of the unit (h), being the base of one (49) of said transistors, one output of said threshold current amplifier, and of said unit (h), being common with the collector of the last one (50) of said transistors in the current amplifier, another output of the latter being the collector of said last transistor (50), said last-names other output being connected to said other input of the switch (g);

i. a second transistor switch (15), having two inputs and one output, one of said inputs being connected to said one output (IV) of the unit (a); said third circuit (11*a* in d) having its leads connected to said output of the stabilizer (f) and said negative supply bus;

j. an excessive illumination indicating unit (8) having two inputs (I, II) and two outputs (III, IV), there being connected to one (I) of said inputs the center tap of said third circuit (11*a* in d), another one (II) of said inputs being connected to said output of the switch (i), said unit (j) including a threshold current amplifier including serially interconnected transistors (56 to 59) that constitute a common-emitter circuit and operate in the switching mode, one input of said last-named threshold current amplifier, which forms said one input (I) of the unit (j), being the base of one (57) of said transistors, one output of the same amplifier, and of the unit (j), being the collector of the last one (59) of said transistors in the threshold current amplifier, said other output being the collector of another one (58) of said transistors, said other output being connected to said other input of the switch (i);

k. an actuator (6) connected between said positive supply bus and said one output (III) of the unit (a); and

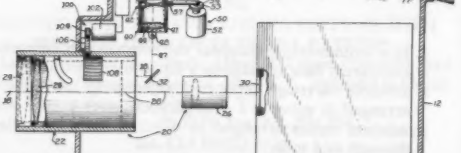
l. two indicator lamps (16, 17), each having one of its terminals connected to said positive supply bus, the other terminals being respectively connected to said one outputs of the units (h and j).

4,041,505

AUTOMATIC ELECTRONIC RANGEFINDER

Rudolf Hartmann, Skokie, Ill., assignor to Bell & Howell Company, Chicago, Ill.

Filed Dec. 31, 1975, Ser. No. 645,764
Int. Cl.[2] G03B 7/08
U.S. Cl. 354—25 **7 Claims**



1. In an automatic focusing system for use in photographic apparatus comprising:

focusable objective lens means for receiving and refracting light radiation reflected from an object to be focused upon;

optical means having a rear nodal point for receiving and refracting the light radiation from the objective lens means through the rear nodal point to form an image in an image plane;

oscillating means for oscillating the optical means about the rear nodal point, whereby the image is cyclically displaced at the frequency of said oscillation means when the image is out of focus, the magnitude of said image dis-

placement being proportional to the degree that the image is out of focus;

sensing means including at least one photocell means displaced from the central axis of the light radiation refracted from said optical means for sensing said cyclical image displacement to provide an image displacement signal having an amplitude indicative of the magnitude of said image displacement and having a phase indicative of the direction in which said objective lens means is out of focus with respect to said object;

processing means responsive to said sensing means to provide an output signal which indicates the amount and direction said objective lens means must be moved to bring the image into focus; and

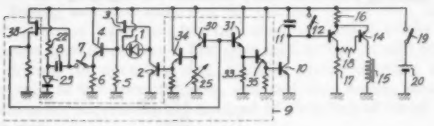
servo means responsive to the output signal for moving the objective lens means to bring the image into focus.

4,041,506

TIMING CIRCUITS FOR CAMERA SHUTTERS

Masahiro Kawasaki, and Hirokazu Ando, both of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Japan

Filed July 25, 1975, Ser. No. 599,005
Claims priority, application Japan, July 27, 1974, 49-89965
Int. Cl.[2] G03B 7/08
U.S. Cl. 354—51 **10 Claims**



1. In an electric shutter circuit for use in a camera of the type employing a light receiving element which generates a current corresponding to the light received by the camera from a scene, said circuit including a memory capacitor which is charged according to said current, buffer amplifier means connected between said light receiving element and capacitor and having a large input impedance and a low output impedance, said buffer amplifier means being connected with said capacitor for charging the latter with said low output impedance, and, for controlling the discharge time of said capacitor, voltage responsive means connected in series with said capacitor and operative to alter the rate at which said current charges said capacitor according to said light received, said voltage responsive means being directly coupled at least in part between said capacitor and a point of reference potential, forming the only means connecting said memory capacitor to said reference potential, for reducing the level to which said memory capacitor is charged to thereby attain a decrease in discharge time of the memory capacitor enabling rapid shutter operation.

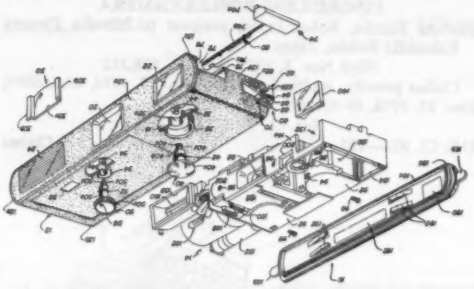
4,041,507

CAMERA FOR UNDERWATER AND ABOVE WATER USE

Norman Wah Man Ko and Chan Kwok Yan, both of North Point, Hong Kong, assignors to W. Haking Industries, Ltd., Hong Kong, Hong Kong

Filed July 2, 1975, Ser. No. 592,634
Int. Cl.[2] G03B 187/08
U.S. Cl. 354—64 **13 Claims**

1. A camera adapted for underwater as well as above water use comprising: a camera mechanism support frame supporting camera mechanism constituting substantially all of the functional components of the camera and characterized in that by itself it is incapable of insulating the camera mechanism associated with it from contact with the elements including rain and dust and including a film unit-receiving portion for receiving a film unit in operative picture-taking position without opening of any closure means thereof; and a housing comprising a housing body having opening-forming portions which provides an entry for the insertion of said support frame into a compartment defined by the housing body and the passage of said film unit into said operative position in said support frame without removal of the support frame from said housing body, said housing body having a front wall portion forming transparent objective and viewfinder window means for admitting picture forming and viewfinder light rays for exposing film carried by the camera mechanism support frame and for enabling a user to view a scene to be photographed by the camera, and removable closure means for the opening-forming



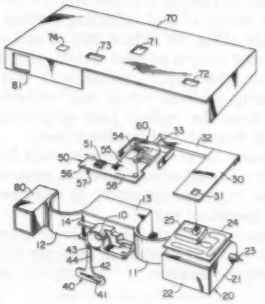
portions in the housing body for enabling film to be inserted into and removed from the support frame while the support frame is positioned in the compartment defined by the housing body, said closure means being provided with sealing means for enabling the closure means to be engaged in watertight and dustproof locked relationship with the main housing body, and said housing further having opening forming portion through which operating controls extend in watertight operation between the exterior of the camera housing to said camera mechanism on the support frame for operating the same.

4,041,508

CAMERA INSTALLED WITH ELECTRONIC FLASH

Akio Edamoto, Kawasaki, and Tooru Hayakawa, Yokohama, both of Japan, assignors to Sunpak Corporation, Tokyo, Japan

Filed Feb. 25, 1976, Ser. No. 661,382
Int. Cl.[2] G03B 17/18
U.S. Cl. 354—128 **9 Claims**



1. An electronic flash-installed camera, including means for securing a power source therein, in which the shutter speed is fixed and the iris opening is variable, said camera comprising an outer casing, at least one iris opening indicating window formed on the surface of the outer casing, an iris member having an iris hole for controlling the iris opening, weather marks indicating the weather condition by pictures, distance marks indicating by pictures a distance to an object to be photographed, a first means for moving said weather marks and distance marks below said iris opening indicating window and for moving said iris member in correspondence with

movement of the weather marks and distance marks to thereby change the iris opening value, a power switch for turning said power source on and off, and an indication change-over device mechanically coupled to said power switch for selectively exposing one of said distance marks or weather marks through said iris opening indicating window in response to on and off switching motions of said power switch.

4,041,509

SINGLE LENS REFLEX CAMERA

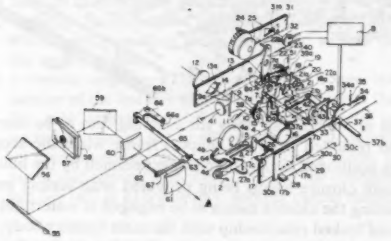
Harumi Tanaka, Kobe, Japan, assignor to Minolta Camera Kabushiki Kaisha, Japan

Filed Nov. 3, 1975, Ser. No. 628,312

Claims priority, application Japan, Nov. 2, 1974, 49-126097; Dec. 27, 1974, 49-002268

Int. Cl.[2] G03B *19/12*

U.S. Cl. 354—152 **12 Claims**



1. A single lens reflex camera having an objective lens, a shutter member, means for opening the shutter to initiate exposure, means for closing the shutter to terminate the exposure and a mirror driving mechanism, the mirror driving mechanism comprising:

a shaft arranged off the optical path of picture-taking light transmitted through said objective lens and in parallel with the optical axis of said objective lens;

a lever pivotally supported on said shaft and pivotable between a first position and a second position;

a mirror having a reflecting surface, said mirror being rigidly mounted on said lever so that when said lever is in said first position said mirror is positioned in a viewing position where the center of said reflecting surface is positioned substantially along the optical axis of said objective lens and when said lever is pivoted into its second position said mirror is simultaneously pivoted with said lever into a picture-taking position where said reflecting surface is retracted from the optical path of picture-taking light transmitted through said objective lens;

operating means for pivotally moving said lever from said first position to said second position, prior to commencement of an exposure operation, in response to a shutter releasing operation; and

returning means for returning said lever from said second position to said first position in response to completion of such exposure operation.

4,041,510

INDICATING DEVICE FOR PHOTOGRAPHIC APPARATUS

Frederick William Kern, Fairport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 6, 1976, Ser. No. 656,037

Int. Cl.[2] G03B *17/36*

U.S. Cl. 354—217 **13 Claims**

1. A photographic camera for use with an insertable and removable cartridge containing sequentially exposable film image areas, said camera comprising:

means defining an exposure station;

means defining a chamber for receiving the cartridge in an operative position wherein the film image areas are sequentially locatable at said exposure station;

means for making an exposure of each of the film image areas when located at said exposure station;

means actuatable after each said exposure for transporting the exposed one of the film image areas from said exposure station;

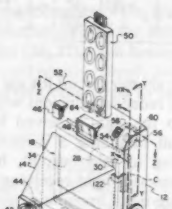
means defining a site for displaying indicia presented thereto;

an exposure counter bearing indicia for identifying the film image areas and for indicating, exclusively, absence or presence of the cartridge in said chamber, said counter being mounted for movement to a plurality of positions respectively presenting said indicia to said site, said positions including a first position presenting to said site a first indicium indicating exclusively absence of the cartridge from said chamber, a second position presenting to said site a second indicium indicating exclusively presence of the cartridge in said chamber, and subsequent positions presenting sequentially to said site subsequent indicia identifying respectively the film image areas;

first biasing means biasing said counter in a first direction toward said first position;

ratchet means coupled to said counter;

indexing means movably mounted for engaging said ratchet



means and indexing said counter, in a second direction opposite to said first direction, from said first position to said second position in response to insertion of the cartridge into said operative position in said chamber and for preventing said first biasing means from returning said counter to said first position so long as the cartridge remains in said operative position;

second biasing means for urging said indexing means away from said ratchet means in response to removal of the cartridge from said chamber, to permit said first biasing means to return said counter to said first position, said indexing means being movable into counter-indexing engagement with said ratchet means in opposition to said second biasing means upon insertion of the cartridge into said operative position;

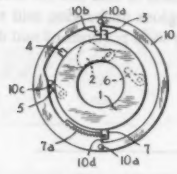
advancing means movably mounted for engaging said ratchet means and advancing said counter in said second direction to a respective one of said subsequent positions in response to each actuation of said transporting means; and

third biasing means biasing said advancing means away from said ratchet means irrespective of absence or presence of the cartridge in said chamber, said advancing means being movable into counter-advancing engagement with said ratchet means in opposition to said third biasing means upon actuation of said transporting means.

4,041,511
DRIVING DEVICE OF LENS SHUTTER OF SINGLE-LENS REFLEX CAMERA

Kiyoshi Kitai, Tokyo; Yukio Nakamura, Yotsukaido; Shogo Kato, Daiei, and Shinji Nagaoka, Yotsukaido, all of Japan, assignors to Seiko Koki Kabushiki Kaisha, Japan

Filed Apr. 18, 1974, Ser. No. 462,181
Claims priority, application Japan, Apr. 19, 1973, 48-43650
Int. Cl.[2] G03B 9/00, 9/10
U.S. Cl. 354—232 4 Claims

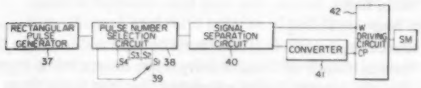


1. A lens shutter for a single-lens reflex camera comprising, shutter blade means, an operating ring for operating said shutter blade means for closing the shutter and opening the shutter, a driving device for driving the operating ring in opposite directions for effecting control of the shutter blade means and for driving said operating ring for cocking the shutter, said driving device comprising two operating rods driven axially in opposite axial directions, a first gear rack on one of said rods for driving the operating ring, coupling means coupling the gear rack to the operating ring, and said rods having means coactive for sequencing the reversal of direction of travel of both rods.

4,041,512
LIGHT CONTROL DEVICE

Hiroshi Iwata, Osaka, and Katsuji Ishikawa, Daito, both of Japan, assignors to West Electric Co., Ltd., Japan

Filed Feb. 18, 1975, Ser. No. 550,544
Claims priority, application Japan, Feb. 22, 1974, 49-21154; Feb. 22, 1974, 49-21155
Int. Cl.[2] G03B 9/08
U.S. Cl. 354—234 21 Claims

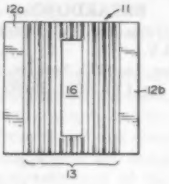


1. A light control device comprising:
A. a light control mechanism comprising
   a. shutter blade means drivable to a plurality of positions for defining at each position a different aperture, and
   b. shutter blade driving means connected to said shutter blade means for driving said shutter blade means to successive positions in response to each pulse of a first pulsatory signal and for controlling the direction of driving said shutter blade means in response to each pulse of a second pulsatory signal,
B. a control circuit for providing said pulsatory signals comprising,
   a. a rectangular pulse generator for generating driving pulse signals and having an output terminal,
   b. circuit means connected to said pulse generator for selectably controlling the number of pulses applied to said output terminal of said pulse generator,
   c. circuit means responsive to said pulses at said output terminal for producing said first pulsatory signal, and
   d. circuit means continuously responsive to said pulses at said output terminal for producing said second pulsatory signal, whereby said second pulsatory signal may occur a plurality of times for a selected number of pulses at said output terminal.

4,041,513
SHUTTER FOR PHOTOGRAPHIC CAMERAS

Toshihiro Kondo, Chofu, Japan, assignor to Toshihiro Kondo, Tokyo and Fuji Photo Film Co., Ltd., both of, Japan

Filed Mar. 19, 1976, Ser. No. 668,807
Claims priority, application Japan, Mar. 19, 1975, 50-33196; May 14, 1975, 50-57134
Int. Cl.[2] G03B 9/28, 9/32
U.S. Cl. 354—241 6 Claims

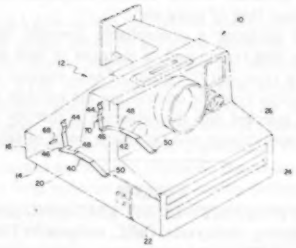


1. A shutter blind for a photographic camera for opening and closing a film aperture in a camera body comprising a light impervious flexible sheet having a number of accordion pleats forming parallel folding lines therebetween, said sheet being shrinkable and expandable in the direction perpendicular to said folding lines and having an exposure opening in the middle thereof extending parallel to said folding lines, and both ends of said sheet being fixed to the camera body at opposite ends of a film aperture.

4,041,514
PHOTOGRAPHIC CAMERA HAVING EXTERNAL POWER SUPPLY

Bruce K. Johnson, Andover, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed May 27, 1975, Ser. No. 581,113
Int. Cl.[2] G03B 17/02
U.S. Cl. 354—288 4 Claims



1. A camera comprising:
a housing;
means defining a chamber for receiving a film cassette containing at least one film unit;
means for performing a function associated with the processing of the film unit;
electrically energizable means adapted to be operatively coupled to said performing means;
an electrical circuit connected to said electrically energizable means, said circuit including a pair of contacts adapted for engagement with the terminals of a battery located within said camera to provide a source of energy for said electrically energizable means; and
means for defining a recess in an exterior surface of said

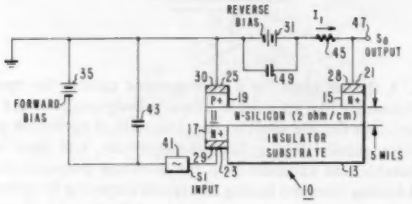
housing for releasably receiving at least a portion of a battery assembly to couple the battery assembly to said housing, said recess including means for guiding a pair of battery terminals on the battery assembly to a position within said housing whereat the battery terminals on the battery assembly engage and move said contacts out of engagement with the terminals of the battery located within the camera thereby providing a new source of energy for said electrically energizable means.

4,041,515

AVALANCHE TRANSISTOR OPERATING ABOVE BREAKDOWN

Kern Ko Nan Chang, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Nov. 14, 1975, Ser. No. 632,062
Int. Cl.² H01L *29/90*
U.S. Cl. 357—13 **3 Claims**



1. An avalanche device comprising,

a body of semiconductor material having a substrate of one conductivity type material with two separate regions of highly doped material of said one conductivity type on said substrate and a region of highly doped material of a second different conductivity type on said substrate,

means for applying a reverse bias voltage between said region of material of said second conductivity type and one of said regions of highly doped material of said one conductivity type, said reverse bias voltage having a magnitude to exceed the avalanche breakdown of voltage of said substrate where current amplification factor is many times that of unity and,

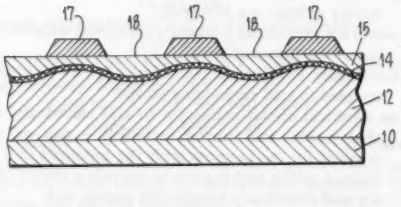
means for applying a controllable forward bias voltage between said region and of material of said second conductivity type and the other of said regions of said one conductivity type for controlling the number of minority carriers injected into the substrate to thereby change the breakdwon voltage and operating point of said device.

4,041,516

HIGH INTENSITY LIGHT-EMITTING DIODE

Roger W. Murray, Sunnyvale, Calif., assignor to Litronix, Inc., Cupertino, Calif.

Continuation of Ser. No. 430,855, Jan. 4, 1974, abandoned. This application July 28, 1975, Ser. No. 599,734
Int. Cl.² H01L *33/00*
U.S. Cl. 357—17 **6 Claims**



1. A non-coherent light-emitting diode array having improved radiation intensity and distribution characteristics, said array comprising:

a semiconductor body having a top surface, a first zone of one conductivity type, and a second zone of opposite conductivity type contiguous with said first zone and forming a rectifying junction therebetween, said second zone having a varying thickness dimension extending from said rectifying junction to said top surface; and

a dielectric surface layer adhered to said top surface, said dielectric surface layer having a plurality of apertures,

said thickness dimension of said second zone being substantially greater in regions underlying said apertures than in regions underlying solid portions of said dielectric surface layer.

4,041,517

VERTICAL TYPE JUNCTION FIELD EFFECT SEMICONDUCTOR DEVICE

Noboru Fuse, and Kenichi Muramoto, both of Hyogo, Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Tokyo, Japan

Filed Aug. 12, 1975, Ser. No. 604,024
Claims priority, application Japan, Sept. 4, 1974, 49-10155
Int. Cl.² H01L *29/80, 27/02*
U.S. Cl. 357—22 **8 Claims**

1. A vertical type junction field effect transistor comprising:

a body of semiconductor material having first and second main faces,

the body including:

a source region of a first conductivity type and having a high concentration of conductivity type determining impurities, the source region extending into the body from the first main face of the body;

a drain region of the first conductivity type and having a high concentration of conductivity type determining impurities, the drain region extending into the body from the second main face of the body and disposed opposite the source region;

a gate region of a second conductivity type opposite to the first conductivity type, the gate region extending into the body from the first main face of the body and directly contacting and surrounding the source region in the form of a closed loop to form a PN junction between the source region and the gate region at only an outer edge of the source region to maintain the gate to source capacity small and to maintain the time constant on the gate input side small; and

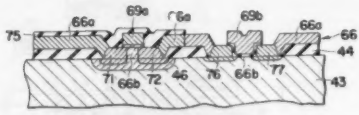
a channel region of the first conductivity type and having a low concentration of conductivity type determining impurities, the channel region extending from the source region towards the drain region and having a channel of varying width in the vicinity of the source region according to the change of a depletion layer arising in the channel region upon voltage application to the gate region.

4,041,518

MIS SEMICONDUCTOR DEVICE AND METHOD OF MANUFACTURING THE SAME

Shinji Shimizu, Choufu; Seiichi Iwamatsu, and Makoto Homma, both of Tokyo, all of Japan, assignors to Hitachi, Ltd., Japan

Continuation of Ser. No. 445,658, Feb. 25, 1974, abandoned.
This application Apr. 14, 1976, Ser. No. 677,023
Claims priority, application Japan, Feb. 24, 1973, 48-22545
Int. Cl.[2] H01L 29/78, 29/04, 27/02
U.S. Cl. 357—23 31 Claims



1. A metal insulator semiconductor field effect device comprising:

a monocrystalline substrate;

a first layer of insulating material disposed on the surface of said substrate and having an opening therethrough exposing a first surface portion of said substrate;

a layer of monocrystalline semiconductor material having a first and second spaced-apart portions of a first conductivity type, disposed on the first surface portion of said substrate; first and second monocrystalline semiconductor regions formed beneath the respective first and second spaced-apart portions of said monocrystalline semiconductor layer, and having said first conductivity type, said first and second spaced-apart portions of said layer together with first and second regions respectively constituting source and drain regions of said field effect device;

first and second polycrystalline semiconductor layers having said first conductivity type respectively contacting said first and second spaced-apart portions of said layer of monocrystalline semiconductor material and extending onto said first layer of insulating material, and respectively constituting source and drain electrodes for said source and drain regions;

a second layer of insulating material disposed on a third portion of said layer of monocrystalline semiconductor material between said first and second spaced-apart portions thereof, said third portion of said layer of monocrystalline semiconductor material having a second conductivity type, opposite said first conductivity type; and

a gate electrode disposed on said second layer of insulating material between said first and second spaced-apart surface portions of said substrate.

4,041,519

LOW TRANSIENT EFFECT SWITCHING DEVICE AND METHOD

Roger D. Melen, 565 Arastradero, No. 304, Palo Alto, Calif. 94306

Filed Feb. 10, 1975, Ser. No. 548,407
Int. Cl.[2] H01L 27/14, 31/00, 29/78, 27/02
U.S. Cl. 357—30 9 Claims

1. An array image sensor responsive to sequentially applied control signals for converting an incident energy pattern into pulses electrical output energy substantially free of switching noise, comprising:

an array of reversed biased energy responsive diodes which receive the incident pattern and accumulate electrical charge in response thereto;

output means for outputting the pulses electrical output energy;

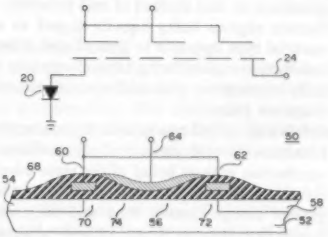
a plurality of MOS transistor switching devices, one associated with each diode of the array, each switching device serially connected between the associated diode of the array and the output means, each switching device having:

a substrate means with a source electrode means and drain electrode means formed in spaced relationship therein, the source electrode means connected to the associated diode and the drain electrode means connected to the output means;

a first and second control gate means and an electric shield gate means formed over the substrate means in spaced relationship between the electrode means, the gate means being activated by the control signals for establishing electrical continuity within the substrate means between the electrode means;

an insulative means formed between the electrode means and the gate means;

the first control gate means positioned proximate the source electrode means between the source electrode means and the second control gate means for reducing the electrical capacitance from the second control gate means to the source electrode means, and being activated by control signals prior to activation of the second control gate means for charging the electrical capacitance from the first control gate means to source electrode means, and for establishing a field induced inversion region in conjunction with the accumulated charge within the substrate means proximate the source electrode means and the first control gate means;



the shield gate means positioned proximate the drain electrode means between the drain electrode means and the second control means for reducing the electrical capacitance from the second control gate means to the drain electrode means, and being activated by the control signals prior to activation of the second control gate means for charging the electrical capacitance from the shield gate means to the drain electrode means, and for establishing a field induced depletion region within the substrate means proximate the drain electrode means and the shield gate means;

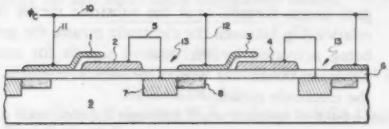
the second control gate means positioned between the first control gate means and the shield gate means and being activated by control signals subsequent to the first control gate means and the shield gate means for establishing a field induced region within the substrate proximate the second control gate means which connects the depletion region proximate the drain electrode means with the inversion region proximate the source electrode means to provide temporary electrical continuity between the electrode means permitting the accumulated charge to flow from the diode through the switching device to the output means forming a pulse of electrical output energy with a minimum of switching noise;

whereby the accumulated electrical charge of a particular diode of the array is selectively discharged to the output means by the first and second control gate means of the associated switching device being activated by the control signals.

4,041,520
UNIPHASE CHARGE TRANSFER DEVICE

Wallace Edward Tchon, Phoenix, Ariz., assignor to Honeywell Information Systems Inc., Phoenix, Ariz.

Filed Aug. 6, 1976, Ser. No. 712,302
Int. Cl.[2] H01L *29/78, 29/04;* G11C *19/28*
U.S. Cl. 357—24 10 Claims



1. A uniphase charge transfer device comprising

a substrate of semiconductor material,

an insulating layer of substantially uniform thickness on one surface of said substrate,

a plurality of electrode pairs disposed on said insulating layer, a first electrode of each of said electrode pairs having a portion which overlaps the second electrode of each of said electrode pairs, the first and second electrodes of each electrode pair being in the same relative positions and of the same relative dimensions, and the first electrode of each electrode pair being laterally separated from the second electrode of an adjacent electrode pair by a separation of a predetermined length,

a plurality of first conduction regions in said substrate and proximate to said surface of said substrate, said first conduction regions being heavily doped to a conductivity material type opposite to that of said substrate, said first conduction regions being located opposite to and substantially coextensive with said separations between adjacent electrode pairs,

a plurality of second conduction regions in said substrate and proximate to said surface of said substrate, said second conduction regions being of the same conductivity material type as said substrate and having a substantially greater charge density than said substrate, said second conduction regions being located adjacent to said first conduction regions and underlying a portion of said first electrode of each of said electrode pairs,

means for electrically connecting said second electrode of each of said electrode pairs with said first conduction region which is adjacent to it, and

means for alternatingly applying a voltage of a given magnitude to said first electrode of each of said electrode pairs to cause minority charges to move in a predetermined direction along the surface of said substrate.

4,041,521
SHIFT ARRAY FOR PATTERN INFORMATION PROCESSING DEVICE UTILIZING CHARGE COUPLED SEMICONDUCTOR DEVICE

Hideo Sunami, Kokubunji; Yokichi Itoh, Hachioji; Fumiyuki Inose, and Yoshiaki Kamigaki, both of Kokubunji, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Oct. 18, 1972, Ser. No. 298,569
Claims priority, application Japan, Oct. 18, 1971, 46-81691
Int. Cl.[2] H01L *29/78*
U.S. Cl. 357—24 8 Claims

1. A shift array for shifting carriers introduced into a semiconductor body along first and second respective directions, comprising:

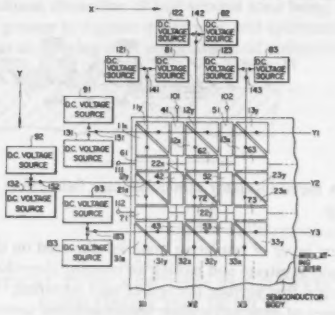
a semiconductor body;

an insulating film disposed on the semiconductor body;

a matrix of sets of electrodes disposed on said insulating layer made of n rows of sets of electrodes disposed in said first direction and m columns of sets of electrodes disposed in said second direction, each second of electrodes comprising a pair of electrode portions located next to one another;

n conductors respectively connected to a first electrode portion of each electrode set in a corresponding row of said *n* rows of sets of electrodes;

m conductors respectively connected to a second electrode portion of each electrode set in a corresponding column of said *m* columns of sets of electrodes;



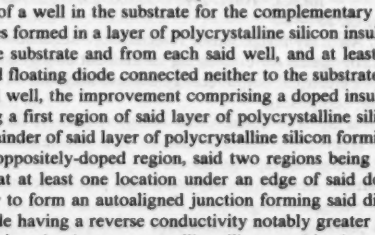
first means, disposed adjacent the last ones of said sets of electrodes, for detecting transferred minority carriers; and

second means for selectively applying D.C. voltages to the conductors of said rows and columns for effecting the transfer of minority carriers along the surface of the semiconductor body therebeneath toward said first means.

4,041,522
INTEGRATED CIRCUIT AND MANUFACTURE THEREOF

Henri J. Oguey, Corcelles, NE, and Bernard Gerber, Neuchatel, both of Switzerland, assignors to Centre Electronique Horloger S.A., Switzerland

Filed Aug. 19, 1975, Ser. No. 605,845
Claims priority, application Switzerland, Aug. 29, 1974, 11788/74
Int. Cl.[2] H01L *27/02, 29/78, 29/04*
U.S. Cl. 357—42 1 Claim



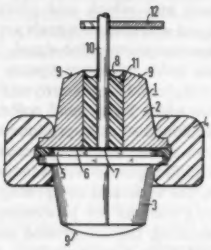
1. In an integrated circuit comprising complementary field effect transistors (FET) having channels extending on the surface of a substrate for one type of transistor and on the surface of a well in the substrate for the complementary type and gates formed in a layer of polycrystalline silicon insulated from the substrate and from each said well, and at least one so-called floating diode connected neither to the substrate nor to a said well, the improvement comprising a doped insulator covering a first region of said layer of polycrystalline silicon, the remainder of said layer of polycrystalline silicon forming a second oppositely-doped region, said two regions being contiguous at at least one location under an edge of said doped insulator to form an autoaligned junction forming said diode, said diode having a reverse conductivity notably greater than that of a junction in monocrystalline silicon, and having well-reproduceable characteristics.

4,041,523

CONTROLLABLE SEMICONDUCTOR COMPONENT HAVING MASSIVE HEAT DISSIPATING CONICALLY SHAPED METAL BODIES

Herbert Vogt, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed June 1, 9176, Ser. No. 691,622
Claims priority, application Germany, June 6, 1975, 2525390
Int. Cl.[2] H01L *23/28, 23/02, 23/12, 23/42*
U.S. Cl. 357—72 8 Claims



1. A controllable semiconductor component for mounting in conically shaped recesses, said component comprising:

a semiconductor element including a ring-shaped cathode on one side, an anode on the opposite side and a control electrode within said ring-shaped cathode;

a housing including a pair of massive metal bodies on respective sides of said semiconductor element connected to said cathode and said anode, respectively, in a heat and electric conductive relationship, said metal body on said cathode side including a central opening therethrough, and an insulating ring securing and sealing said bodies in the area of contact with said semiconductor element, each of said metal bodies comprising a conical shape tapering in the direction away from said semiconductor element for mounting in the conically shaped recesses; and

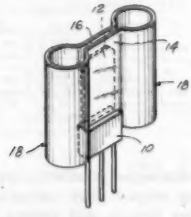
a control lead electrically connected to said control electrode, said control lead extending through said opening to the exterior of housing and rigidly mounted in an insulated manner within said opening.

4,041,524

HEAT DISSIPATING DEVICE FOR TRANSISTOR WITH OUTWARDLY EXTENDING HEAT CONDUCTIVE TAB

Edmund G. Trunk, East Meadow, and Alfred Skrobisch, Huntington Station, both of N.Y., assignors to The Staver Company, Inc., Bay Shore, N.Y.

Continuation-in-part of Ser. No. 537,089, Dec. 30, 1974, abandoned. This application Mar. 24, 1976, Ser. No. 670,000
Int. Cl.[2] H01L *23/42, 23/44, 23/46, 23/02*
U.S. Cl. 357—81 20 Claims



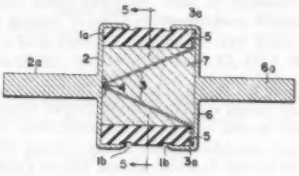
1. A heat dissipating device for mounting on the heat conductive tab of a transistor or the like having a casing in which the transistor is mounted and a heat conductive tab in thermal communication with the transistor, mounted on and extending outwardly from said casing in a given direction, said device comprising a substantially closed body comprising a pair of substantially parallelly situated planar members spaced to receive the tab therebetween with the interior surface of each substantially parallel to and in engagement with the exterior surface of the tab adjacent thereto and resilient connecting means situated on opposite ends of said members and extending therefrom in a direction substantially perpendicular to said given direction for variably spacing said planar members with respect to each other while maintaining said members substantially in said parallel relationship to permit insertion and retention of the tab therebetween.

4,041,525

ELECTRIC FUSE AND PROCESS OF MANUFACTURING THE SAME

Frederick J. Kozacka, South Hampton, N.H., assignor to The Chase-Shawmut Company, Newburyport, Mass.

Filed Apr. 5, 1976, Ser. No. 673,375
Int. Cl.[2] H01H *85/04*
U.S. Cl. 337—295 8 Claims



1. An electric fuse including

a. a tubular casing of electric insulating material having a pair of circular rims at the axially outer ends thereof;

b. a granular arc-quenching filler inside said casing;

c. a pair of ferrules each having an axially inner end surface mounted on the ends of said casing and closing said ends thereof; and

d. fusible element means in ribbon form embedded in said arc-quenching filler, one end of said fusible element means being arranged adjacent the center region of said axially inner end surface of one of said pair of ferrules and conductively connected by a first metal fusion joint to said center region, and the other end of said fusible element means being angularly bent, resting on one of said pair of rims of said casing and being conductively connected to the peripheral region of said axially inner end surface of the other of said pair of ferrules by a second metal fusion joint.

4,041,526

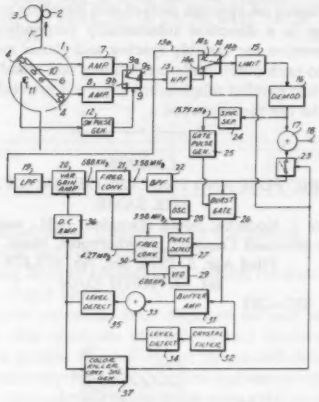
CONTROL OF AUTOMATIC COLOR CONTROL AND COLOR KILLER CIRCUITS IN VIDEO SIGNAL REPRODUCING APPARATUS

Shinji Kaneko, Atsugi, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Oct. 17, 1975, Ser. No. 623,409
Claims priority, application Japan, Oct. 21, 1974, 49-121156
Int. Cl.[2] H04N *5/76, 9/49*
U.S. Cl. 358—4 10 Claims

1. Apparatus for reproducing a signal recorded on a record medium and which includes an information signal and a reference signal of a predetermined frequency occurring only during spaced intervals, comprising transducer means for reproducing the signal recorded on the record medium, variable gain amplifier means receiving the reproduced signal and providing a controlled level reproduced signal, gate means receiving said controlled level reproduced signal and being controlled in synchronism with said spaced intervals so as to provide a first output signal including said reference signal during each of said intervals, filter means coupled to said gate

means and tuned to said predetermined frequency for receiving said first output signal and passing only said reference signal therein so as to produce a second output signal, combining means coupled to receive said first and second output signals



for combining the levels of said first output signal as provided by said gate means and said second output signal as produced by said filter means, and means for controlling the gain of said variable gain amplifier means in accordance with said combined levels of said first and second output signals.

4,041,527

VIDEO EFFECTS GENERATOR

Bruce Leland Rayner, and Gerald Graham Taylor, both of Nevada City, Calif., assignors to The Grass Valley Group, Inc., Grass Valley, Calif.

Filed Mar. 15, 1976, Ser. No. 667,242
Int. Cl.[2] H04N 9/00
U.S. Cl. 358—22 **11 Claims**

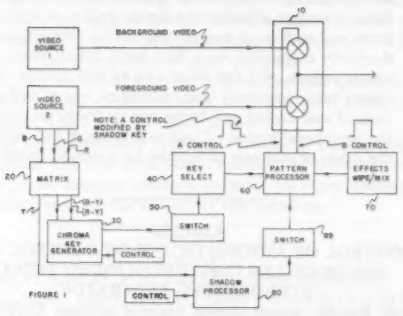


FIGURE 1

1. An apparatus for switching a plurality of video signals so as to produce a composite video signal that produces a composite image containing portions of the incoming video signals including intensities to provide shadows, the apparatus comprising:

video source means for generating a plurality of incoming video signals, said signals defining a plurality of color signals forming at least first and second color video signals representing first and second information;

matrix means coupled with said video source means for forming color difference signals and a luminance signal representing a portion of information of one of said color video signals;

color selector means responsive to said color difference signals for developing a first key signal representing a selectable color of said portion of information of said one of said color video signals;

luminance selector means responsive to said luminance signal for developing a second key signal representing variable intensities of said portion of information of said one of said color video signals;

processor means responsive to both said first and second key signals for developing control signals, at least one of which is modulated in accordance with the variable intensities of said portion of information of said one of said color video signals; and

combining means into which said plurality of incoming video signals and said control signals are fed for providing thereoutof the composite video signal.

11. A composite color television system wherein separate background and foreground scenes derived from a background color video source and a foreground color video source are provided to be combined so as to produce a composite video signal that produces a composite image containing portions of the background and foreground scenes including intensities to produce shadows, the apparatus comprising:

a first processing channel for processing color difference signals representing the foreground scene derived from the foreground color video source;

a second processing channel for processing luminance signals representing the foreground scene derived from the foreground color video source;

a third processing channel for combining the processed color difference signals and the processed luminance signals to form control signals; and

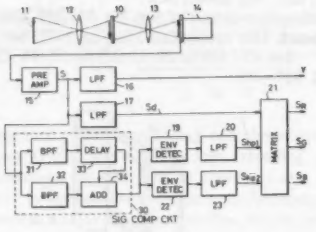
mixing means, coupled to receive inputs from both the background and foreground color video sources, under the control of said control signals for combining said inputs in such a manner as to produce the composite video signal.

4,041,528

COLOR TELEVISION SIGNAL GENERATING APPARATUS FOR USE IN A SINGLE CAMERA TUBE

Tadayoshi Miyoshi; Shintaro Nakagaki; Itsuo Takanashi; Sumio Yokokawa, all of Yokohama; Kenichi Miyazaki, Sagamihara; Hisanori Tumiyama, Yokohama, and Koithiro Motoyama, Kanagawa, all of Japan, assignors to Victor Company of Japan, Limited, Yokohama, Japan

Filed Feb. 9, 1976, Ser. No. 656,205
Claims priority, application Japan, Feb. 20, 1975, 50-20405; Feb. 25, 1975, 50-23297; Mar. 1, 1975, 50-24515; Mar. 3, 1975, 50-25782; Mar. 5, 1975, 50-25895
Int. Cl.[2] H04N 9/07
U.S. Cl. 358—47 **6 Claims**



1. A color television signal generating apparatus comprising:

a color-resolving striped filter comprising a plurality of groups of filter stripes, said groups being disposed in parallel and consecutively in a sequentially repeated arrangement, each of said groups comprising at least three filter stripes from among

a first filter stripe having a light transmission characteristic for transmitting the light of one of the three primary colors of an addition mixture color,

a second filter stripe having a light transmission characteristic for transmitting the light of a mixed color which includes the primary color transmitted through said first filter stripe and one of the other two primary colors, and

a transparent third filter stripe for transmitting white light, said at least three filter stripes being arranged in parallel and consecutively in a specific sequence;

a camera tube having said color-resolving striped filter disposed on the front surface thereof and producing a superimposed output signal comprising, in superimposition:

a direct wave signal containing signals of the three primary colors of said addition mixture color, and

a high-band signal component comprising a group of modulated color signals resulting from an amplitude modulation of a carrier wave by the signals of two primary colors other than the primary color of the light transmitted through said first filter stripe, said carrier wave having a frequency equal to a space frequency determined by the number of said groups of filter stripes, and said carrier wave also having frequency components which are higher harmonics of the frequency of said carrier wave;

low-pass filter means for separating said direct wave signal from the output signal of said camera tube;

first band-pass filter means for separating a fundamental carrier wave signal component having a frequency equal to the space frequency of the filter stripes from the high-band signal component of said output signal of said camera tube;

second band-pass filter means for separating a harmonic signal component having a second harmonic relationship to the frequency of the fundamental carrier wave signal component from said high-band signal component;

adding means for adding the output signals of said first and second band-pass filter means in such a ratio that the amplitude of the fundamental carrier wave signal component is substantially twice that of the harmonic signal component in the output of said adding means;

first envelope detection means for producing a demodulated signal responsive to an envelope formed by successively connecting positive peak values of the output signal of said adding means;

second envelope detection means for producing a demodulated signal responsive to an envelope formed by successively connecting negative peak values of the output signal of said adding means; and

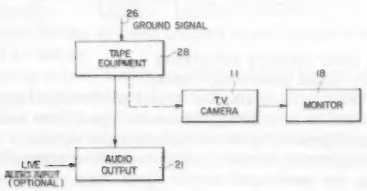
matrix means responsive to the output signals of said low-pass filter means and the first and second envelope detection means for producing three primary color output signals.

4,041,529

AIRPLANE ROUTE VIEWING SYSTEM

Clarence William Masterfield, Petaluma, Calif., assignor to The Raymond Lee Organization, Inc., New York, N.Y.; a part interest

Filed Apr. 12, 1976, Ser. No. 675,727
Int. Cl.² H04N *7/18*
U.S. Cl. 358—109 **1 Claim**



1. A system for automatic display of visual televised information on an airplane accompanied by a recorded audio narrative comprising

a television camera mounted on an airplane focused to televise a pictorial representation of the ground scene below the airplane in flight, said camera joined to a visual monitoring screen in the cabin of the airplane,

sound playback equipment connected to a loudspeaker in the said airplane cabin, said equipment equipped with a recorded message describing the sequence of visual scenes that are to be displayed on the said monitoring screen over a particular section of the route of the airplane,

said playback equipment activated by radio means on the aircraft in association with ground marker beacon means on the path of said route,

said camera and monitoring equipment connected to said playback equipment so that the playback equipment, when activated, serves to actuate the said camera and monitoring equipment such that

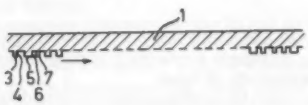
actuation of said playback equipment causes the playback of said recorded message in synchronization with operation of the said camera and monitoring screen.

4,041,530

VIDEO DISC WITH PHASE STRUCTURE

Pieter Kramer; Klaas Compaan, both of Eindhoven, Netherlands, and Robert Franz Karl Forsthuber, Vienna, Austria, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 396,399, Sept. 12, 1973, abandoned, which is a continuation of Ser. No. 229,285, Feb. 25, 1972, abandoned. This application Sept. 30, 1975, Ser. No. 618,215
Claims priority, application Netherlands, Mar. 4, 1971, 7102863
Int. Cl.² H04N *5/76;* **G11B** *7/24, 23/00*
U.S. Cl. 358—128 **8 Claims**



1. A carrier for storing information in the form of a signal angle modulated by said information and readable with a light beam comprising a disk provided with a spiral pattern of regions having flat substantially coplanar upper surfaces, each region separated from an adjacent region by a flat area of the disk that is coplanar with all of the other flat areas between adjacent regions of the spiral pattern, both the areas and regions being of varying lengths, the plane of the flat areas being parallel to the plane of the regions, the material with which said regions and areas are composed having the same optical properties, and the distance between the plane of the flat areas and the plane of the regions being sufficient to introduce a phase difference of nL/2 between beam portions which coact with the flat areas and those which coact with the regions, where *n* is a positive odd integer and L is the wavelength of the light beam.

4,041,531

TELEVISION SIGNAL PROCESSING APPARATUS INCLUDING A TRANSVERSAL EQUALIZER

Joseph Peter Bingham, Princeton Junction, N.J., assignor to RCA Corporation, New York, N.Y.

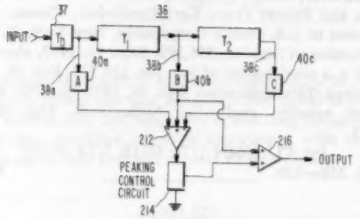
Continuation-in-part of Ser. No. 486,241, July 5, 1974, abandoned. This application Feb. 27, 1975, Ser. No. 553,642
Int. Cl.² H04N *9/535*
U.S. Cl. 358—37 **30 Claims**

1. In a color television receiver including a source of composite video signals, said composite video signals including a luminance component occupying a wide band of frequencies and a chrominance component occupying a portion of said wide band of frequencies, said chrominance component comprising modulated color subcarrier waves; apparatus for processing said composite video signals, comprising:

a chrominance channel coupled to said source of composite video signals and including means responsive to said modulated subcarrier waves for deriving therefrom a plurality of color difference signals with an effective delay of a given magnitude;

a luminance channel including:

1. a delay line coupled to said source of composite video signals, said delay line having a plurality of terminals for providing a plurality of delayed video signals, said plurality of delayed video signals being delayed by different amounts;
2. first means providing a first combined signal comprising the sum of two of said delayed video signals which differ in delay by a time interval substantially equal to NT/2, where T is a period at the frequency of the color subcarrier of said composite video signals, and N is an integer greater than one;
3. means for deriving a broadband signal from at least one other of said delayed video signals, said broadband signal having an average delay between the delays of



the signals comprising said first combined signal and of a delay magnitude substantially corresponding to said given magnitude of delay;

4. second means for combining said broadband signal with said first combined signal to produce a second combined signal having first and second amplitude transition portions of a black-going direction and a white-going direction, respectively;
5. means for adjusting the amplitude of said second combined signal to produce a resultant signal of the form of said second combined signal; and
6. third means for combining said broadband signal with said resultant signal to produce an output signal having controllably accentuated black-going and white-going amplitude transition portions as determined by said first and second amplitude transition portions of said second combined signal; and

means for combining said output signal with each of said plurality of color difference signals to form a plurality of color signals.

4,041,532

METHOD OF RECORDING WIDE-BAND SIGNALS ON A THERMOPLASTIC FILM BY USE OF A BEAM OF ELECTRONS

Graham Stuart Plows, and Gordon Malcolm Edge, both of London, England, assignors to Decca Limited of Decca House, London, England

Division of Ser. No. 463,252, April 23, 1974, Pat. No. 3,952,146, and a continuation-in-part of Ser. No. 247,443, April 28, 1972, Pat. No. 3,821,488. This application July 31, 1975, Ser. No. 600,573

Claims priority, application United Kingdom, Apr. 28, 1971, 11993/71

Int. Cl.[2] **H04N** *5/82*

U.S. Cl. 358—128 **5 Claims**

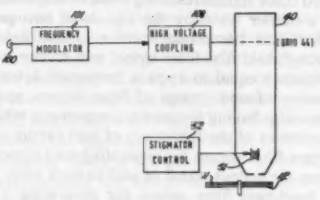
1. A method of recording a wide-band signal on a master record medium in the form of a groove which is to determine the shape of a corresponding groove in a derived record medium which groove therein is to be tracked by a reproducing stylus, comprising the steps of:

directing a beam of electrons at a thin film of electrically resistive thermoplastic material which is supported by a conductive substrate;

moving said film relative to said beam so as to cause said beam to deposite a continuous track of electrical charge on the film;

modulating the intensity of the beam in accordance with the said wide-band signal;

focussing said beam to produce a focus having an effective diameter, in a sense along the direction of progression of



the track, which is substantially less than the shortest wave-length in said wide-band signal;

producing astigmatism in said beam to produce an elliptical focus which is elongate in a direction transverse the direction of progression of said track and has in the said transverse direction a second diameter which is a substantial fraction of the width of the track, so as thereby to cause said track to be of a width which is significantly wider than the effective diameter and has a charge density which is substantially greater in the middle of the track than at the edges thereof; and

heating and cooling said film.

4,041,533

DELAY CIRCUITRY

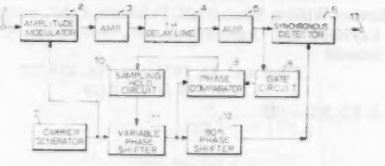
Katsuhiko Yamamoto, Neyagawa; Kunihiko Hontani, Katano; Hiromu Kitaura, Osaka, and Michio Nakamura, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Sept. 19, 1975, Ser. No. 615,084

Claims priority, application Japan, Dec. 19, 1974, 49-155700[U]; Dec. 19, 1974, 49-155701[U]; Feb. 18, 1975, 50-22727[U]; Sept. 28, 1974, 49-112177

Int. Cl.[2] **H04N** *5/14;* **H03B** *3/04*

U.S. Cl. 358—160 **20 Claims**



1. A delay circuitry comprising

carrier signal generating means;

modulating means coupled to said carrier signal generating means for modulating the carrier signal from said carrier signal generating means with an input signal;

delaying means coupled to said modulating means for delaying the modulated carrier signal from said modulating means and in which drift or fluctuation of the delay time may occur;

demodulating means coupled to said delaying means for demodulating the modulated and delayed carrier signal from said delaying means with a demodulating signal to produce a delayed signal;

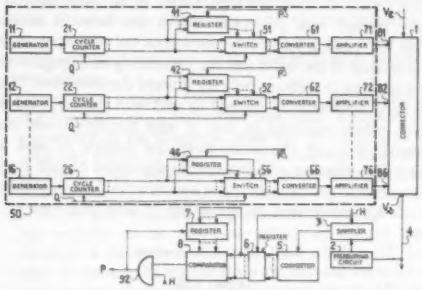
first circuit means coupled to said delaying means and said demodulating means for detecting the phase difference between said demodulating signal and said modulated and delayed carrier signal to generate a detected voltage; and

second circuit means coupled to said first circuit means and being responsive to said detected voltage and also coupled to the carrier signal generating means for controlling the phase relationship between said demodulating signal and said modulated and delayed carrier signal so as to be constant, whereby the delayed signal is not affected by drift or fluctuation of the delay time which may occur in said delaying means.

4,041,534
AUTOMATIC DISTORTION CORRECTION ARRANGEMENT

Pierre Chabanel, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Feb. 11, 1976, Ser. No. 657,290
Claims priority, application France, Feb. 14, 1975, 75.04698
Int. Cl.² H04N 5/38
U.S. Cl. 358—186 **4 Claims**



1. An automatic distortion correcting arrangement comprising:

a variable characteristic corrector having an input for receiving an input signal, *n* independent control inputs for respectively controlling *n* parameters of said variable characteristic, where *n* is a positive integer, and an output;

a generating system, having a control input, for supplying said *n* control inputs respectively with a set of *n* random signals, during each one of recurrent test time intervals separated by longer time intervals, and with a set of *n* signals identical with a selected set of *n* signals previously generated by said generating system during one of said test time intervals, during each one of said longer time intervals;

a channel having an input coupled to said corrector output, and an output;

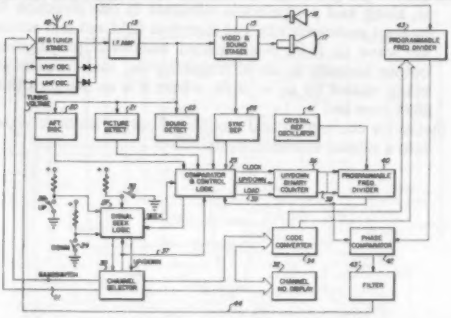
measuring means, having an input coupled to said channel output, and an output, for delivering in the course of each one of recurrent time intervals including at least all the test time intervals, an output measurement signal characteristic of the degree of distortion of the output signal from said channel;

and a control circuit having an input coupled to said measuring means and an output coupled to said generating system control input, for controlling the selected set of *n* signals applied to said corrector *n* control inputs, during each one of said longer time intervals.

4,041,535
FREQUENCY SYNTHESIZER TUNING SYSTEM WITH SIGNAL SEEK CONTROL

Theodore S. Rzeszewski, Lombard; Paul D. Frantzis, Chicago, both of Ill., and Sotirios Sideris, Sunnyvale, Calif., assignors to Matsushita Electric Corporation of America, Franklin Park, Ill.

Filed July 22, 1976, Ser. No. 707,674
Int. Cl.² H04N 5/44
U.S. Cl. 358—191 **7 Claims**



1. A frequency synthesizer signal seek tuning system for a tuner of a television receiver capable of receiving a composite television signal, said system including in combination:

reference oscillator means providing a reference signal at a predetermined frequency;

local oscillator means in the tuner providing a variable output frequency in response to the application of a control signal thereto;

a programmable frequency divider having an input coupled to said reference oscillator means for producing an output signal having a frequency which is a programmable fraction of the frequency of the signal applied to the input thereto from said reference oscillator means;

means coupled to the output of said programmable frequency divider and the output of said local oscillator means for developing a control signal and applying such control signal to said local oscillator means for controlling the frequency of operation thereof;

channel selection means coupled to said programmable frequency divider for establishing a predetermined initial programmable fraction therein each time a new channel is selected by said channel selection means;

control means coupled to the output of the tuner of the television receiver and further coupled to said programmable frequency divider for controlling said frequency divider to change the programmable fraction thereof in response to predetermined conditions of the signals from the tuner; and

signal seek tuning means coupled to said channel selection means and said control means for causing said channel selection means to select a new channel in response to said predetermined conditions of the tuner signals persisting for a predetermined time period.

4,041,536
OPTICAL SCANNER

Robert Lee Melcher, Yorktown Heights, and Norman Steven Shiren, Ossining, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 24, 1975, Ser. No. 643,971
Int. Cl.² H04N 5/30
U.S. Cl. 358—213 **12 Claims**

1. Apparatus for converting an optical image into a related electrical signal comprising

a photosensitive semiconductor body,

a piezoelectric substrate adjacent to said semiconductor containing defect sites on which electrons can be trapped

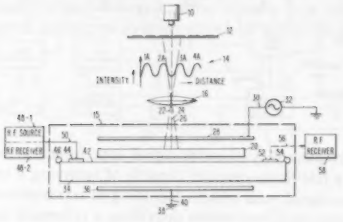
and such traps can be subsequently ionized by electric fields,

means for applying radiofrequency electrical field to said semiconductor of frequency ω_2,

means for imaging the optical image on said semiconductor to fill electron traps therein corresponding to said optical pattern, whereby charge distributions appear in the semiconductor in accordance with information present in the optical image,

means for propagating an input acoustic wave of frequency ω_1 along said piezoelectric substrate in one direction to interact parametrically said electrical field and said acoustic wave to form a modulated backward propagating output acoustic wave of frequency ω_1, said frequencies being related by $\omega_2 = \omega_1/n$, where n is an integer other than zero and

means for converting said modulated output acoustic wave into a related electrical signal.



11. In an apparatus for scanning an optical pattern, a fully anion-compensated photosensitive piezoelectric substrate containing defects on which electrons can be trapped and such traps can be subsequently ionized by electric fields,

means for applying an optical pattern of charging light to said piezoelectric substrate to fill electron traps therein corresponding to said optical pattern,

an acoustic wave input transducer means attached to said piezoelectric substrate for generating an input acoustic wave of frequency ω_1 in one direction past said film,

means for applying a radiofrequency electric field of frequency ω_2, where $\omega_1 = \omega_2$, in said film where said charge distributions and said acoustic wave are adjacent to interact non-linearly said acoustic wave and said radiofrequency electric field to produce stored charge distributions in said film representative of said optical pattern.

4,041,537

TAPE CASSETTE WITH LOCKING SENSOR SLIDE

Yoshio Kishi, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

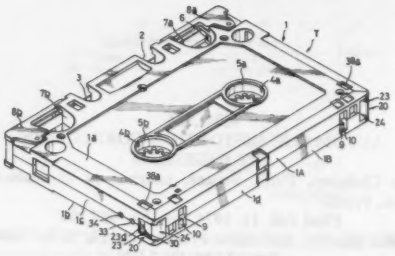
Filed Apr. 9, 1976, Ser. No. 675,461

Claims priority, application Japan, Apr. 17, 1975, 50-52352[U]

Int. Cl.² G11B *23/08, 23/00*

U.S. Cl. 360—60 **11 Claims**

1. A tape cassette for use in tape recording and reproducing apparatus that includes cassette locating means for positioning the cassette at an operative station in the apparatus, and an actuating element that extends adjacent said station and is movable between two positions for selectively placing the recording circuit of said apparatus in its operative and inoperative modes respectively: said cassette comprising a housing including a wall portion, and means defining a recess in said housing with an opening to said recess at a location in said wall portion which is disposed adjacent said actuating element when the cassette is at said operative station; and a control element including a body portion slidably movable in said recess between first and second positions in which said body portion substantially blocks and unblocks, respectively, said opening to the recess so that, in said first position of said body portion, the latter excludes said actuating element from said recess for establishing one of said two positions of the actuating element and, in said second position of said body portion, the latter permits the entry of said actuating element through said opening into said recess for establishing the other of said two positions of the actuating element, and a resilient arm connected at one end with said body portion for movement with the latter along an inner surface of said wall portion adjacent said opening to the recess, said resilient arm having an outwardly directed projection adjacent its other end, and said wall portion having first and second through-holes therein spaced apart in the direction of said movement of the resilient arm with said body portion and selectively receiving said projection in said first and second position, respectively, of the body portion, each of said through holes being dimensioned to closely engage said projection when the latter is received therein for locking said body portion in the respective one of said positions of the latter and for permitting disengagement of the projection therefrom only by inward displacement of said projection substantially normal to said wall portion said projection, when received in one of said through-holes, being accessible through the latter from the outside of said wall portion for effecting said inward displacement of said projection out of said one through-hole and thereby freeing said body portion for movement to the other of said positions of the latter.



4,041,538

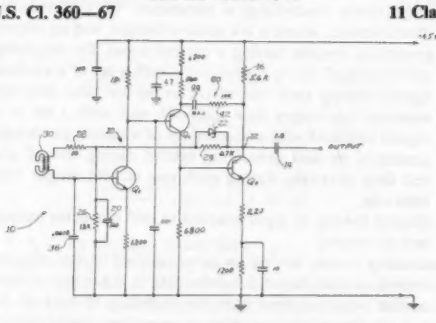
LOW NOISE MAGNETIC TRANSDUCER PREAMPLIFIER HAVING FLAT RESPONSE

Robert R. Parker, Des Plaines, Ill., assignor to Bell & Howell Company, Chicago, Ill.

Filed Apr. 12, 1976, Ser. No. 676,237

Int. Cl.² G11B *5/02*

U.S. Cl. 360—67 **11 Claims**



1. An improved reproduction preamplifier in a machine utilizing a magnetic recording medium, comprising:

a reproduction amplifier circuit including at least one transistor and having an input terminal and an output terminal;

a feedback loop between said output terminal and said input terminal; and

a magnetic playback transducer connected in a direct cur-

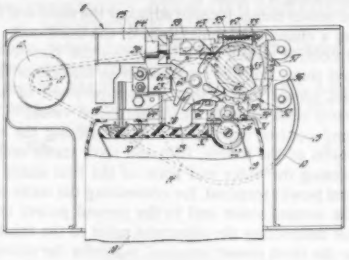
rent series circuit with said feedback loop and said input and output terminals whereby direct current feedback current provides a predetermined direct current bias level for the magnetic playback transducer.

4,041,539

TAPE HEAD SHIFT APPARATUS FOR MULTI-TRACK TAPE PLAYER

Wilbur A. Robarge, Kokomo, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 16, 1976, Ser. No. 714,586
Int. Cl.² G11B *21/08, 5/55*
U.S. Cl. 360—106 **1 Claim**



1. In a multi-track tape player including a magnetic head shiftable between tape tracks, apparatus for continuously driving the tape past the magnetic head and intermittently shifting the magnetic head between tracks, the apparatus comprising, in combination:

a tape-driving capstan; motor means for continuously driving the capstan; a rotatable first cam; a cam follower connected to the magnetic head for co-movement therewith and biased to follow the first cam and thus shift the magnetic head between tape tracks with cam rotation; a driving member fixed to the capstan for rotation therewith; an idler member being actuable to engage the driving member to be positively rotatably driven thereby through a predetermined rotational angle and, having been so driven, disengage from the driving member; solenoid means selectively actuable to actuate the idler member; and geneva gear apparatus connecting the idler member to the first cam, the geneva gear apparatus comprising a geneva drive member being connected to the idler member for rotation therewith and having a circular second cam with a concave excluded sector and a pin adjacent the excluded sector and further comprising a geneva driven member having a plurality of wings, one wing for each tape track, each wing having a concave peripheral surface matching the second cam and being separated from adjacent wings by radial slots, the geneva driven member being fixed to the first cam for rotation therewith and positioned adjacent the driving member with a wing normally engaging the second cam to prevent rotation thereof while engaged and a slot adjacent the wing being adapted to receive the pin during rotation of the driving member to rotate the next adjacent wing into engagement with the second cam and thus rotate the first cam to shift the magnetic head between tape tracks.

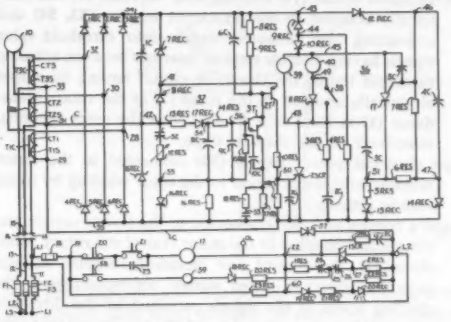
4,041,540

SOLID STATE OVERLOAD RELAY CIRCUIT

Julian C. Kampf, Grafton; Winfred R. Lemke, Mequon, and James T. Tucker, Milwaukee, all of Wis., assignors to Square D Company, Park Ridge, Ill.

Filed Feb. 2, 1976, Ser. No. 654,425
Int. Cl.² H02H *7/085*
U.S. Cl. 361—24 **12 Claims**

1. A solid state overload relay comprising: a current transformer having a secondary winding energized by current in a conductor and providing an output signal indicative of the magnitude of the current in the conductor, a capacitor, circuit means including a magnet coil, energized by the output signal for charging the capacitor to an adjustable fraction of the magnitude of the output signal, said circuit means including a plurality of impedance circuits connectible in parallel across the capacitor with each of said impedance circuits including a switch connected in series with a precisely calibrated resistor, said resistors having impedances selected so the closure of the switch in its associated circuit will cause the impedance con-



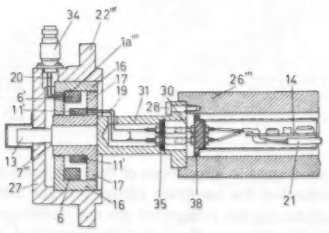
nected in parallel with the capacitor to be reduced by a preselected increment whereby the magnitude of the output signal required to charge the capacitor to a preprogrammed level may be varied in precise preselected increments and each of said switches having an operator accessible from the exterior of a housing for the relay, whereby the response of the relay to current in the conductor may be programmed by actuating the operators of selected switches, and means responsive to the charge on the capacitor for causing the magnet coil to be de-energized when the charge on the capacitor equals the preprogrammed level.

4,041,541

SUPERVISORY AND CONTROL SYSTEM FOR ROTARY MACHINERY, PARTICULARLY ROTARY ELECTRICAL MACHINES

Emile Frossard, Wettingen; Fritz Schleuniger, Wurenlos, and Bruno Stadler, Untersiggenthal, all of Switzerland, assignors to Brown, Boveri & Cie., Baden, Switzerland

Filed Dec. 31, 1975, Ser. No. 645,889
Claims priority, application Switzerland, Jan. 17, 1975, 588/75
Int. Cl.² H02H *7/08*
U.S. Cl. 361—27 **35 Claims**



1. Rotary machine supervisory system for components of a rotating part of the machine comprising

at least one measuring sensor **(53,54)** providing measuring signals, located in or on the rotary machine part;

a rotary transducer **(1)** forming a transformer having a stator **(1*a*)**, including a stator core and a stator winding located

on a stationary part of the machine, and a rotor (7) including a rotor core and a rotor winding located on the rotary machine part;

the core of the stator being ring-shaped and having, in axial section, an L-shaped cross section and the core of the rotor (7) being ring-shaped and having, in axial section, an L-shaped cross section, said cores of the stator, and rotor, respectively, being positioned to form, together, a generally O-shaped, or rectangular axial section providing for coupling of said cores and hence of said windings.

a threshold circuit (14) rotating with the rotor (7) and electrically coupled to the sensor, or sensors (53, 54) and converting the measured signals into threshold-value signals having discrete steps or intervals between adjacent threshold levels, the threshold circuit having its output electrically coupled to the rotor (7) of the rotary transducer (1) in form of a load to load the rotor winding, selectively, in said discrete steps;

an electrical power supply (50) connected to the stator winding to transfer power to the rotor winding by transformer action;

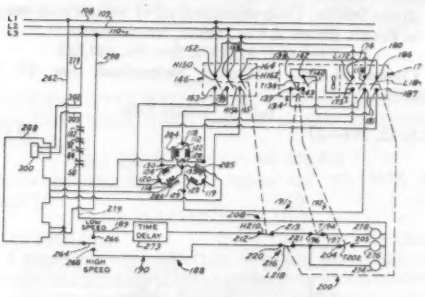
and a control unit (33) connected to the power supply and electrically coupled to the stator (1a) of the rotary transducer (1), the control unit including response circuits providing discrete output signals corresponding to the discrete levels of the signals provided by the threshold circuit (14) and coupled through the transducer (1) to the control unit, said transducer further coupling electrical power from the stator to the rotor and hence to the threshold circuit (14) and the sensor, or sensors (53, 54).

4,041,542

CONTROL APPARATUS FOR TWO-SPEED COMPRESSOR

David M. Pfarrer, Hurst, and Sidney A. Parker, Fort Worth, both of Tex., assignors to Lennox Industries, Inc., Marshalltown, Iowa

Division of Ser. No. 436,179, Jan. 24, 1974, Pat. No. 3,935,519.
This application Sept. 5, 1975, Ser. No. 610,530
The portion of the term of this patent subsequent to Jan. 27, 1993, has been disclaimed.
Int. Cl.[2] H02H 7/08
U.S. Cl. 361—27 2 Claims



1. In a refrigerant compressor of the type having a compression mechanism for receiving refrigerant gas from a suction line, compressing the refrigerant gas and discharging the compressed refrigerant gas through a discharge line, and a motor for rotating shaft means in the compression mechanism at low speed and at high speed from a source of three-phase electrical power including first, second and third power terminals, said motor including a first stator coil, a second stator coil and a third stator coil adapted to receive three-phase electrical power, each stator coil having an inner end point connected to a common conductor and also having an outer end point, improved control apparatus for protecting the stator coils comprising:

a fourth stator coil having a second end point and also having a first end point connected to the outer end point of the first stator coil;

a fifth stator coil having a second end point and also having a first end point connected to the outer end of the second stator coil;

a sixth stator coil having a second end point and also having a first end point connected to the outer end point of the third stator coil;

first sensor means located adjacent the first coil for indicating a change in temperature of the first coil;

second sensor means located adjacent the second coil for indicating a change in temperature of the second coil;

third sensor means located adjacent the third coil for indicating a change in temperature of the third coil;

first control means for interrupting the flow of current to said stator coils in response to an indication from any of said sensor means that the temperature of any of said stator coils exceeds a predetermined value;

second control means for interconnecting the second end points of the fourth, fifth and sixth stator coils, for connecting the outer end point of the first stator coil to the first power terminal, for connecting the outer end point of the second stator coil to the second power terminal and for connecting the outer end point of the third stator coil to the third power terminal, whereby the motor rotates at high speed; and

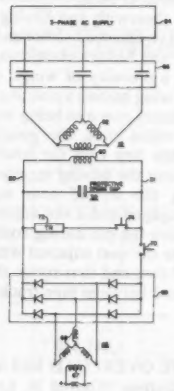
third control means for connecting the second end point of the fourth stator coil to the first power terminal, for connecting second end point of the fifth stator coil to the second power terminal and for connecting the second end point of the sixth stator coil to the third power terminal, whereby the motor rotates at low speed.

4,041,543

FIELD PROTECTOR FOR SYNCHRONOUS MACHINES

Maurice J. Pasculle; Edgar F. Merrill, both of Pittsburgh, and Carl J. Heyne, Allison Park, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 25, 1975, Ser. No. 561,725
Int. Cl.[2] H02H 7/09
U.S. Cl. 361—33 7 Claims



1. In a dynamoelectric machine of the type in which a rotating magnetic field causes a voltage to be induced within a winding, the combination with said winding of a weldable spark gap electrically connected in parallel with said winding, said spark gap having a plurality of electrodes which are

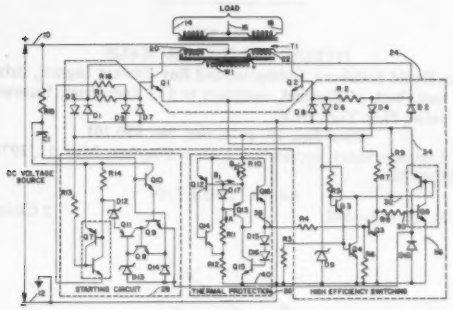
closely spaced to weld together when the voltage induced in said winding exceeds a predetermined safe operating level.

4,041,544

DC TO AC INVERTER HAVING IMPROVED SWITCHING EFFICIENCY, OVERLOAD AND THERMAL PROTECTION FEATURES

John P. Walden, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 516,773, Oct. 21, 1977, Pat. No. 3,956,684. This application Dec. 18, 1975, Ser. No. 641,997
Int. Cl.² H02H *7/122*
U.S. Cl. 361—106 **4 Claims**



1. A thermal protection circuit for an integrally formed integrated electrical circuit which provides an electrical signal representative of the temperature of the integrated electrical circuit thus enabling protective action to be taken such as disablement of the integrated circuit operation, said protection circuit comprising:

at least one temperature sensitive element integrally formed with said integrated circuit and having a predetermined voltage variation thereacross versus temperature variations thereof at a predetermined current level therethrough, and

current regulation means connected to supply and substantially maintain said predetermined current through said temperature sensitive element except for possible current variations as a function of temperature in a direction to enhance the temperature sensitivity of said thermal protection circuit, said current regulation means including first and second transistor means each having base, collector and emitter elements,

said first transistor means having its collector and emitter elements electrically connected in a series circuit with a source of electrical current, said temperature sensitive element and the base-emitter circuit of said second transistor means,

the collector of said second transistor means being connected to the base of said first transistor means and also operatively connected to said current source for by-passing at least a portion of non-temperature related current variations therefrom around said temperature sensitive element;

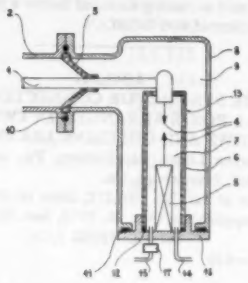
said electrical signal being produced as the voltage across said temperature sensitive element.

4,041,545

LIGHTNING CONDUCTOR IN A METALLIC CASING

Robert Deville, Lyon, France, assignor to Delle-Alsthom, Villeurbanne, France

Filed Oct. 1, 1975, Ser. No. 618,612
Claims priority, application France, Oct. 2, 1974, 74.33188
Int. Cl.² H02H *9/06*
U.S. Cl. 361—120 **4 Claims**



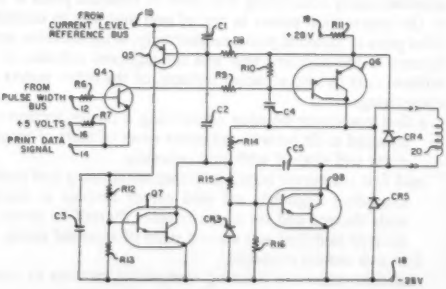
1. A lightning conductor comprising: a metallic casing filled with dielectric fluid under pressure; an enclosure arranged on the inside of said metallic casing and filled with insulating gas, said enclosure having inlet means for the flow of insulating gas from the exterior of said casing to the interior of said enclosure, said enclosure having outlet means for the flow of insulating gas from the exterior of said casing to the interior of said enclosure, said enclosure having outlet means for the flow of insulating gas from the interior of said enclosure to the exterior of said casing, the pressure within said enclosure being substantially lower than the pressure of the dielectric fluid in said metallic casing, said inlet means and outlet means inhibiting effects from rise of pressure within said enclosure due to penetration of dielectric fluid into said enclosure, said dielectric fluid being arranged to hold a high-tension electrical device in said casing.

4,041,546

SOLENOID DRIVER CIRCUIT

John W. Stewart, Wichita, Kans., assignor to NCR Corporation, Dayton, Ohio

Filed June 4, 1976, Ser. No. 693,034
Int. Cl.² H01H *47/04*
U.S. Cl. 361—152 **10 Claims**



2. An excitation control circuit for an actuating solenoid member comprising:

an actuating solenoid;

a first and a second terminal for receiving a differential voltage;

switch means having a closed and an open state for connecting and disconnecting said first and said second terminal in

circuit with said actuating solenoid in response to the commands of a control signal;

means for providing a sensing signal indicative of the current level in said actuating solenoid; and

means responsive to said sensing signal for providing said control signal for closing said switch means in response to a solenoid activation signal and for cyclically opening said switch means in response to the level of said sensed signal for fixed periods in order to maintain the level of current through said actuating solenoid below a pre-selected level during solenoid activation.

4,041,547

CONNECTOR SYSTEM FOR CONNECTING TOGETHER TERMINAL POSTS ARRANGED IN TWO MATRICES WHOSE ROWS AND COLUMNS ARE INTERLEAVED

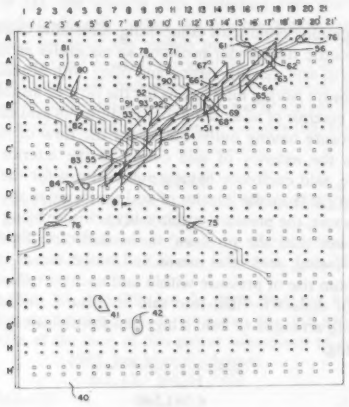
Winfield Warren Loose, Linglestown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 588,271, June 18, 1975, abandoned.

This application Oct. 26, 1976, Ser. No. 735,488

Int. Cl.[2] H05K *1/04*

U.S. Cl. 361—410 **3 Claims**



1. In combination with an array of terminal posts mounted vertically upon a planar substrate and arranged in a pair of matrices superimposed upon one another with the columns and rows thereof being interleaved in alternate manner and with each matrix intersection point in both matrices containing at least two terminal posts, a connector system for selectively and simultaneously connecting first pairs of terminal posts at each of the intersection points in one of said matrices to second or third pairs of terminal posts, respectively, at intersection points located in the adjacent row and the adjacent column, or the column next to said adjacent column, of the other matrix and comprising:

a first connector housing comprising a center section constructed to fit between adjacent rows of pairs of terminal posts and aligned with said columns;

said first connector housing further comprising end sections extending angularly off said center section at opposite ends thereof and on opposite sides thereof to cover one each of said first and second pairs of terminal posts;

first and second contacts;

said first connector housing comprising cavities to receive and retain said first and second contacts;

said first and second contacts each constructed to connect a contact of said first pair of terminal posts individually to a contact of the second pair of terminal posts;

a second connector housing comprising a substantially straight section constructed to have the ends thereof cover said first and third pairs of terminal posts;

third and fourth contacts;

said second connector housing comprising cavities to receive and retain said third and fourth contacts;

said third and fourth contacts each constructed to connect a contact of said first pair of terminal posts, in the absence of another connector being connected thereto, individually to a contact of said third pair of terminal posts;

said first and second housings being configured, when positioned side-by-side in a given row of intersection points to connect two adjacent pairs of terminal posts in said given row to two pairs of terminal posts spaced apart in the row adjacent said given row by a third pair of terminal posts, to space said housings apart a distance to enable another of said housings to fit therebetween and connect said third pair of terminal posts to a pair of terminal posts in a third row adjacent said adjacent row;

each of said contacts comprising a bifurcated terminal post engaging section with the legs of each bifurcation constructed and positioned within said housing to grip one of said terminal posts therebetween;

said legs of each of said bifurcations having the edge thereof which faces the substrate flared outwardly to facilitate entry of said terminal post between said legs of said bifurcation.

4,041,548

HYBRID CIRCUIT PACKAGE

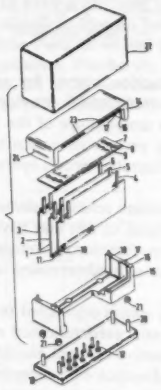
Ian David Salisbury, Galmpton, and Roy Edward Ingram, Brixham, both of England, assignors to ITT Industries, Incorporated, New York, N.Y.

Filed Jan. 19, 1976, Ser. No. 650,201

Claims priority, application United Kingdom, Mar. 11, 1975, 10034/75

Int. Cl.[2] H05K *1/04*

U.S. Cl. 361—396 **2 Claims**



1. A hybrid circuit package comprising:

at least two hybrid circuits having several rigid leads;

a printed circuit board secured substantially at right angles to the plane of each hybrid circuit for interconnecting said leads;

a dismantleable framework for holding said at least two hybrid circuits and said printed circuit board, said dismantleable framework including first and second plastic molded parts having grooves therein for receiving and feeding said hybrid circuits;

a hermetically sealed case for resiliently holding said dismantleable framework; and

an electrical lead-out sealed in a wall of said case and coupled to said at least two hybrid circuits.

DESIGN PATENTS

GRANTED AUGUST 9, 1977

ERRATA

For CLASS	See PATENT NO.
010–116	245,325
064–011 B	245,341
014–043	245,342
015–143	245,366
014–020	245,369
024–059	245,372

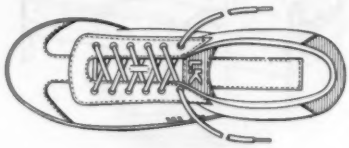
DESIGNS

AUGUST 9, 1977

245,291
COMBINED BLOUSE AND PANTY HOSE ENSEMBLE
Joyce Curry, 2300 S. 24th Road, Apt. 730, Arlington, Va. 22206, and Martha G. Pugh, 11 New Providence Ave., Summit, N.J. 07901
Division of Ser. No. 130,867, April 2, 1971, Pat. No. Des. 233,489, which is a continuation-in-part of Ser. No. D. 24,491, Aug. 14, 1970, abandoned. This application July 15, 1974, Ser. No. 488,455
Term of patent 14 years
Int. Cl. D2—*02*
U.S. Cl. D2—29

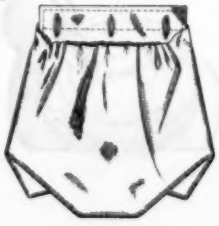
245,292
COMBINED BLOUSE AND PANTY HOSE ENSEMBLE
Joyce Curry, 2300 S. 24th Road, Apt. 730, Arlington, Va. 22206, and Martha G. Pugh, 11 New Providence Ave., Summit, N.J. 07901
Division of Ser. No. 130,867, April 2, 1971, Pat. No. Des. 233,489, which is a continuation-in-part of Ser. No. D. 24,491, Aug. 14, 1970, abandoned. This application July 15, 1974, Ser. No. 488,457
Term of patent 14 years
Int. Cl. D2—*02*
U.S. Cl. D2—29

245,293
SPORT SHOW (BAL PATTERN)
Morris L. Krome, 9 Roland Mews, Baltimore, Md. 21210
Filed Sept. 22, 1975, Ser. No. 615,521
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—310

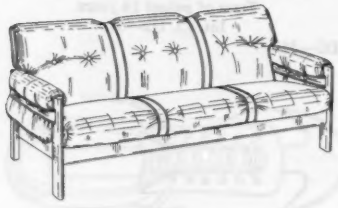


245,294
SKI SOCK
Robert E. Chesebro, Jr., Sheboygan, Wis., assignor to Wigwam Mills, Inc., Sheboygan, Wis.
Filed Mar. 22, 1976, Ser. No. 669,200
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—330

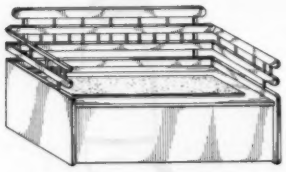
245,295
BUTTON-SUPPORTED TENNIS BALL POCKET
Estelle Margaret Guardino, 180 Bedell St., Hempstead, N.Y. 11551
Filed Apr. 29, 1976, Ser. No. 681,535
Term of patent 14 years
Int. Cl. D2—*07*
U.S. Cl. D2—400



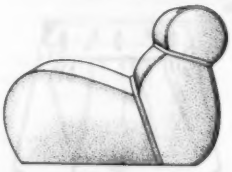
245,296
SOFA
Stapleton Long, Morristown, Tenn., assignor to The Berkline Corporation, Morristown, Tenn.
Filed July 23, 1975, Ser. No. 598,338
Term of patent 7 years
Int. Cl. D6—*01*
U.S. Cl. D6—63



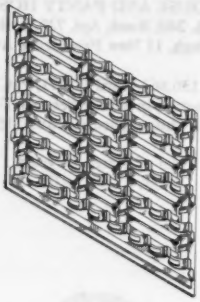
245,297
COMBINED BENCH AND PHONOGRAPH RECORD STORAGE CHEST
James F. Curtin, 16044 E. Queenside Drive, Covina, Calif. 91722
Filed Oct. 7, 1974, Ser. No. 512,617
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—64



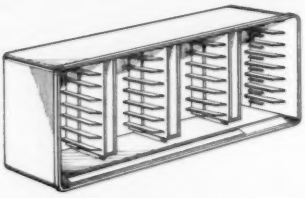
245,298
MODULAR CHAIR
Harry Brahm, P.O. Box 372, Riverside Station, Miami, Fla. 33135
Filed Feb. 25, 1976, Ser. No. 661,175
Term of patent 7 years
Int. Cl. D6—*01*
U.S. Cl. D6—66



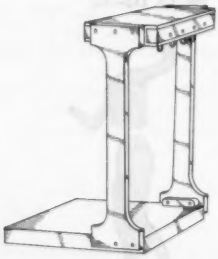
245,299
WALL MOUNTED RACK FOR BEER CANS OR THE LIKE
Paul Beck, 4044 N. Avers Ave., Chicago, Ill. 60618
Filed Jan. 7, 1976, Ser. No. 647,191
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—114



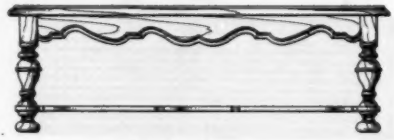
245,300
MAGNETIC TAPE WALL STORAGE UNIT
Gregory Mathus, Sudbury; George Lyman, Weston, both of Mass., and David Roche, Nashua, N.H., assignors to Data Packaging Corporation, Cambridge, Mass.
Filed Apr. 1, 1976, Ser. No. 672,780
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—130



245,301
PORTABLE KITCHEN ISLAND
Carl Brandenfels, Scappoose, Oreg., assignor to H T Products, Inc., Scappoose, Oreg.
Filed Feb. 26, 1976, Ser. No. 661,790
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—157

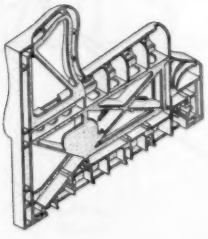


245,302
TABLE
Marion Pratt, High Point, N.C., assignor to J. G. Redmond Associates, Inc. (Entire), High Point, N.C.
Filed Dec. 10, 1975, Ser. No. 639,597
Term of patent 3½ years
Int. Cl. D6—*03*
U.S. Cl. D6—177

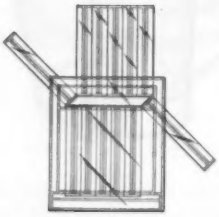


245,303
ELECTRONIC MODULAR DESK, OR SIMILAR ARTICLE
Kenneth F. Gazarek, Warrenville, Ill., assignor to Equipto Electronics Corporation, Aurora, Ill.
Filed Dec. 24, 1975, Ser. No. 644,052
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—177

245,304
FRAME FOR A FURNITURE ARM
Charles P. Bohan, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.
Filed Nov. 3, 1975, Ser. No. 628,011
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—195

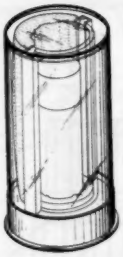


245,305
PHOTOGRAPH DISPLAY STAND
George F. Lyman, Weston, Mass., assignor to Data Packaging Corporation, Cambridge, Mass.
Continuation-in-part of Ser. No. 522,425, Nov. 11, 1974. This application Aug. 5, 1976, Ser. No. 712,023
Term of patent 14 years
Int. Cl. D6—*07*
U.S. Cl. D6—234

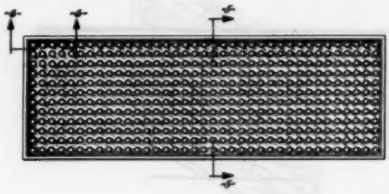


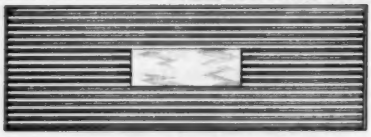
245,306
PORTABLE GOLF BALL WASHER CASE
Elihu Daniel Ryden, 14145 Piedmont St., Detroit, Mich. 48223, and Henry Walter Denski, 11941 Amherst Court, Plymouth, Mich. 48170
Filed June 9, 1975, Ser. No. 584,714
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D7—161

245,307
RECORD CLEANER KIT
Howard Mont, Port Washington, N.Y., assignor to Recoton Corporation
Filed July 12, 1976, Ser. No. 704,235
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D7—178

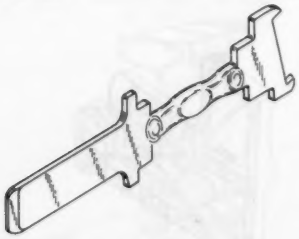


245,308
MAT FOR BEVERAGE CONTAINERS
Clyde B. Baker, P.O. Box 1053, Sacramento, Calif. 95987
Filed Apr. 5, 1976, Ser. No. 673,396
Term of patent 14 years
Int. Cl. D7—*06*
U.S. Cl. D7—188

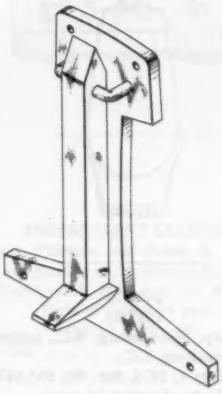




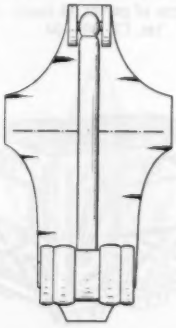
245,309
DIVER'S TOOL
Richard P. Rauth, 205 E. Clifton Ave., Anaheim, Calif. 92805
Filed Mar. 22, 1976, Ser. No. 668,932
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—16



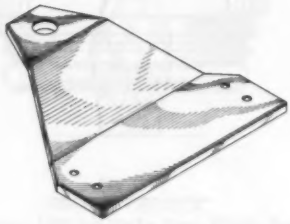
245,310
DOORKNOCKER OR SIMILAR ARTICLE
Francis M. Fenice, 1026 Edgerton Road, Secane, Pa. 19018
Filed Aug. 16, 1976, Ser. No. 714,638
Term of patent 14 years
Int. Cl. D8—*09;* D10—*06*
U.S. Cl. D8—178



245,311
DOOR KNOCKER
Phyllis Smith Galanthay, 22 Manor Way, Poughkeepsie, N.Y. 12603
Filed Sept. 15, 1976, Ser. No. 723,562
Term of patent 14 years
Int. Cl. D8—*09;* D10—*06*
U.S. Cl. D8—178



245,312
CAMPER TIE DOWN
Reed Rasmussen, 168 W. Gentile, Layton, Utah 84041, and Carl M. Rasmussen, 197 E. 1400 South, Bountiful, Utah 84010
Continuation of Ser. No. 280,708, Aug. 14, 1972, abandoned. This application Mar. 31, 1975, Ser. No. 563,877
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—356

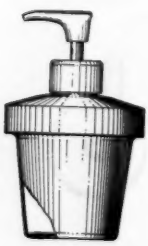


245,313
DUAL WHEEL CASTER
Earl H. Koepke, Youngstown, Ohio, assignor to Harter Corporation, Sturgis, Mich.
Filed Nov. 12, 1976, Ser. No. 741,420
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D8—375

245,314
BOTTLE
Bernard A. Mitchell, 1000 N. Lake Shore Drive, Chicago, Ill. 60611
Filed Aug. 20, 1975, Ser. No. 606,017
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—107

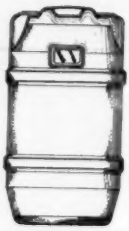
245,315
COMBINED BOTTLE AND CAP
Bernard A. Mitchell, 1000 N. Lake Shore Drive, Chicago, Ill. 60611
Filed Aug. 20, 1975, Ser. No. 606,014
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—107

245,316
LIQUID DISPENSER
George Malcolm McConnell, New York, N.Y., assignor to Pfizer Inc., New York, N.Y.
Filed Dec. 10, 1974, Ser. No. 531,230
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—131

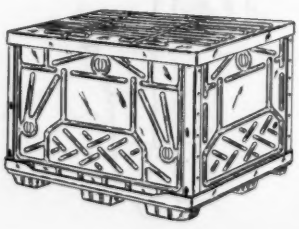


245,317
BOTTLE
John Pardo, Yonkers, N.Y., assignor to The Procter & Gamble Company
Division of Ser. No. 505,307, Sept. 12, 1974. This application Feb. 23, 1976, Ser. No. 660,739
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—156

245,318
DRUM
William M. Yavorsky, Spartanburg, S.C., assignor to Harley Corporation, Spartanburg, S.C.
Filed July 7, 1975, Ser. No. 593,647
Term of patent 14 years
Int. Cl. D9—*02*
U.S. Cl. D9—170

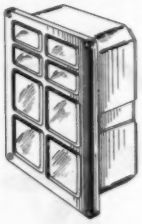


245,319
SHIPPING CONTAINER
William Roy Wodell, Stratford, Conn., assignor to Richard R. Barnes, Jr., Bridgeton and Douglas E. MacArthur, Chesterfield, both of, Mo.
Filed Jan. 26, 1976, Ser. No. 652,216
Term of patent 14 years
Int. Cl. D9—*04*
U.S. Cl. D9—246

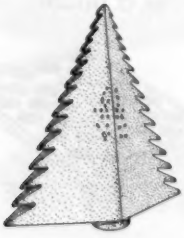


245,320
KITCHEN TIMER OR SIMILAR ARTICLE
Dana W. Mox, Elk Grove Village, Ill., assignor to Hanson Limited, Sligo, Ireland
Filed Feb. 25, 1976, Ser. No. 661,376
Term of patent 14 years
Int. Cl. D10—*03*
U.S. Cl. D10—40

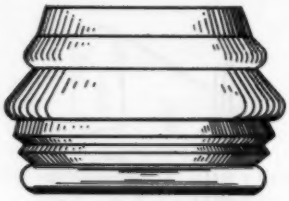
245,321
INSTRUMENT CLUSTER
Robert A. Skyer, Palatine, and James R. McGirk, Medinah, both of Ill., assignors to International Harvester Company
Filed Sept. 5, 1975, Ser. No. 610,702
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—102



245,322
FIRE ALARM
Donald A. White, 4701 E. Kessler View, Indianapolis, Ind. 46220
Filed Feb. 9, 1976, Ser. No. 656,250
Term of patent 14 years
Int. Cl. D10—*05*
U.S. Cl. D10—106

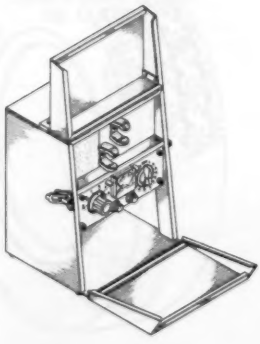


245,323
RING OR SIMILAR ARTICLE
Theodore Galeza, 6109 Stanton Ave., Pittsburgh, Pa. 15215
Filed May 18, 1976, Ser. No. 687,444
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—39

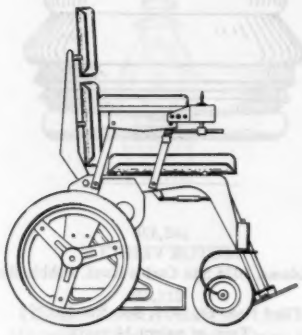


245,324
MOTOR VEHICLE
Herbert L. Adams, 1036 San Carlos Road, Pebble Beach, Calif. 93953
Filed Nov. 19, 1975, Ser. No. 633,271
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—110

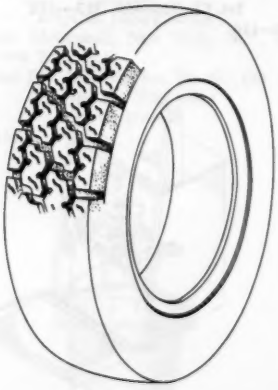
245,325
PORTABLE ULTRASONIC GENERATOR UNIT
Robert J. Lindquist, 605 S. Lucerne Blvd., Los Angeles, Calif. 90020
Filed Jan. 8, 1976, Ser. No. 647,618
Term of patent 14 years
Int. Cl. D10—*06*; D13—*03X*
U.S. Cl. D10—116



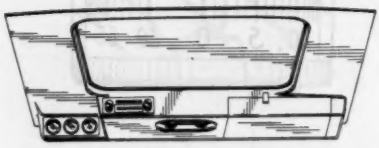
245,326
BATTERY POWERED WHEELCHAIR
Vincent Grippi, Jr., Oakland, Calif., assignor to Center for Independent Living, Inc., Berkeley, Calif.
Filed July 26, 1976, Ser. No. 708,701
Term of patent 14 years
Int. Cl. D12—*12*
U.S. Cl. D12—131



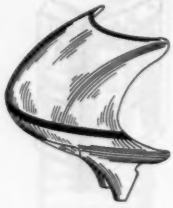
245,327
TIRE FOR A VEHICLE WHEEL
Brian Sidney Bennett, Barton-under-Needwood, England, assignor to Dunlop Limited, London, England
Filed June 8, 1976, Ser. No. 693,773
Claims priority, application United Kingdom, Dec. 19, 1975, 973726/75
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—146



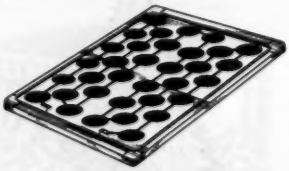
245,328
AUTOMOTIVE TRUCK SERVICE MODULE
Joseph O. Davis, Los Angeles; Edward W. Scott, Culver City, and Lawrence G. McCain, Beverly Hills, all of Calif., assignors to Cruisaire Motor Corporation, Gardena, Calif.
Filed Feb. 11, 1976, Ser. No. 657,030
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—155



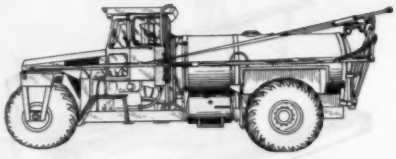
245,329
BICYCLE FAIRING
Gerald A. Wiegert, 1623 W. Washington Blvd., Venice, Calif. 90291
Filed May 5, 1976, Ser. No. 683,262
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—182

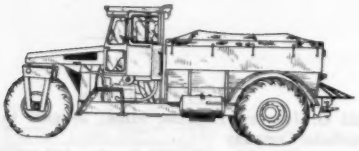


245,330
SOLAR CELL PANEL
Yvon Salles, Thaon, France, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Sept. 10, 1975, Ser. No. 611,866
Claims priority, application France, Mar. 14, 1975, 73.711
Term of patent 14 years
Int. Cl. D13—*02*
U.S. Cl. D13—4

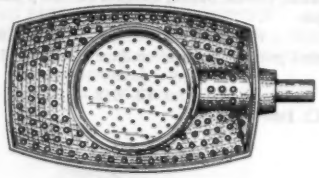


245,331
HIGH FLOTATION VEHICLE FOR USE IN AGRICULTURAL FERTILIZING OR THE LIKE
Lawrence N. Tangeman, Beatrice, Nebr., assignor to Dempster Industries, Inc., Beatrice, Nebr.
Filed Oct. 31, 1975, Ser. No. 627,681
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—13

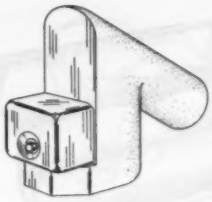




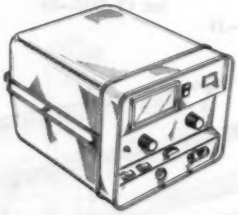
245,332
SPRAY HEAD
Sidney J. Shames, 57 Holly Place, Briarcliff Manor, N.Y. 10510, and Harold Shames, 5 Agnes Circle, Ardsley, N.Y. 10502
Filed Oct. 1, 1976, Ser. No. 728,953
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—35



245,333
PIPE VENT
William V. Porter, c/o The Porter Company, 1620 S. Seguin Ave., New Braunfels, Tex. 78130, and Maurice A. Riordan, 6126 Lynbrook, Houston, Tex. 77057
Filed May 26, 1976, Ser. No. 690,306
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—41

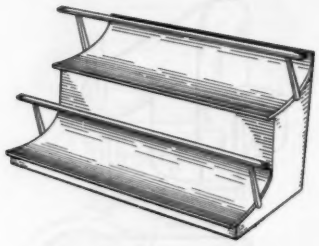


245,334
IMPEDANCE CARDIOGRAPH ENCLOSURE
Leslie R. Walstrom, Excelsior, Minn., assignor to Fabri-Tek Incorporated, Minneapolis, Minn.
Filed Dec. 2, 1976, Ser. No. 746,781
Term of patent 7 years
Int. Cl. D24—*01*
U.S. Cl. D24—17

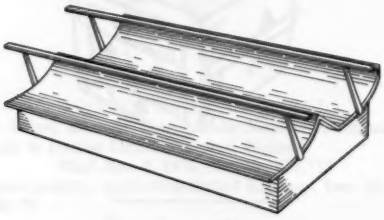


245,335
ORTHODONTIC PACIFIER
Paul K. Meeker, 412 Park, Kent, Ohio 44266, and Richard E. Cone, 249 Bowman Drive, Kent, Ohio 44240
Filed Sept. 2, 1976, Ser. No. 719,981
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D24—45

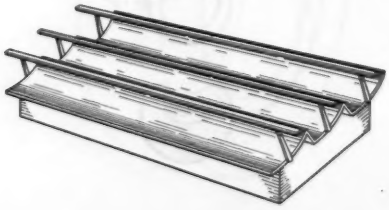
245,336
BUILDING STRUCTURE
Irwin R. Barr, Lutherville, Md., assignor to AAI Corporation, Cockeysville, Md.
Continuation of Ser. No. 562,646, March 27, 1975. This application Sept. 23, 1976, Ser. No. 725,747
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—21



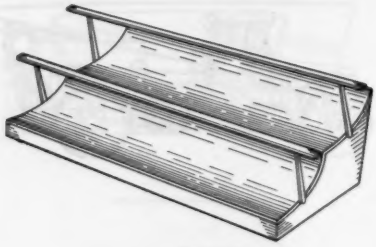
245,337
BUILDING STRUCTURE
Irwin R. Barr, Lutherville, Md., assignor to AAI Corporation, Cockeysville, Md.
Continuation of Ser. No. 562,643, March 27, 1975. This application Sept. 23, 1976, Ser. No. 725,748
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—21



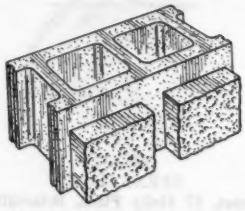
245,338
BUILDING STRUCTURE
Irwin R. Barr, Lutherville, Md., assignor to AAI Corporation, Cockeysville, Md.
Continuation of Ser. No. 562,645, March 27, 1975. This application Sept. 23, 1976, Ser. No. 725,749
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—21



245,339
BUILDING STRUCTURE
Irwin R. Barr, Lutherville, Md., assignor to AAI Corporation, Cockeysville, Md.
Continuation of Ser. No. 562,644, March 27, 1975. This application Sept. 23, 1976, Ser. No. 725,750
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—21

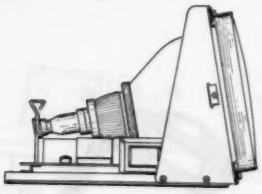


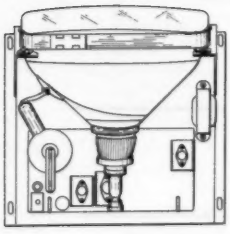
245,340
BUILDING BLOCK
Donald O. Johnson, Hopkins, Minn., assignor to Chas. M. Freidheim Company
Filed May 19, 1976, Ser. No. 687,625
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—92



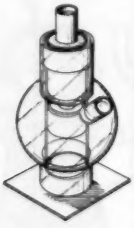
245,341
ELECTRONIC CALCULATING MACHINE
Isao Kitai, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Japan
Filed June 26, 1975, Ser. No. 590,845
Claims priority, application Japan, Dec. 26, 1974, 50-1099
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D64—11 B

245,342
DISPLAY DEVICE FOR A COMPUTER
Reiji Takeuchi, Tokyo, Japan, assignor to Chuomusen Company, Ltd., Omorinishi, Japan
Filed Sept. 25, 1975, Ser. No. 616,705
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—43





245,343
SMOKING PIPE OR SIMILAR ARTICLE
Richard W. Kahler, Rte. 1, Box 61, Rock Cave, W. Va. 26234
Filed Dec. 23, 1975, Ser. No. 643,753
Term of patent 14 years
Int. Cl. D27—*02*
U.S. Cl. D27—3

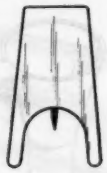


245,344
CIGARETTE SNUFFER
Arthur A. Fisher, 4712 E. Indian School Road, Phoenix, Ariz. 85018
Filed Apr. 26, 1976, Ser. No. 680,503
Term of patent 14 years
Int. Cl. D27—*99*
U.S. Cl. D27—09

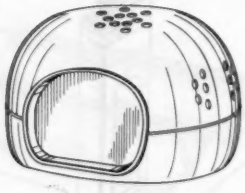
245,345
CIGARETTE GAS LIGHTER
Tomio Nitta, Yokohama, Japan, assignor to Tokai Seiki Co., Ltd., Yokohama, Japan
Filed Mar. 30, 1976, Ser. No. 672,077
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—42

245,346
CIGARETTE LIGHTER
Sadao Yoshinaga, Tokyo, Japan, assignor to Yoshinaga Prince Co., Ltd., Tokyo, Japan
Filed June 16, 1976, Ser. No. 696,711
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—42

245,347
PERFORATOR FOR CIGAR OR CIGARETTE
Everett Randolph Casey, 5845 Old Orchard Trail, Orchard Lake, Mich. 48033
Filed Sept. 15, 1975, Ser. No. 613,166
Term of patent 14 years
Int. Cl. D27—*99*
U.S. Cl. D27—51



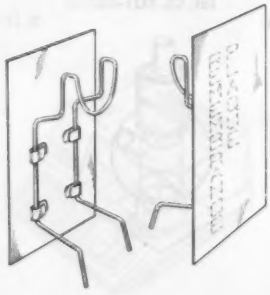
245,348
PET HOUSE
John G. Haviland, 4604 Pine Ridge, Julian, Calif. 92036
Filed Feb. 20, 1976, Ser. No. 659,963
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—1



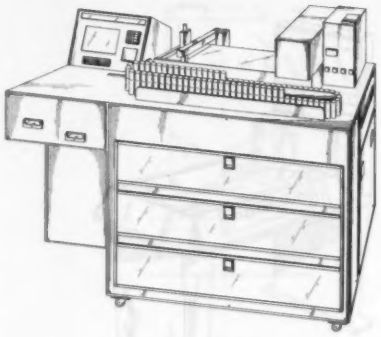
245,349
BIRD FEEDER
James B. Fisher, Jr., 2 Graybridge Lane, St. Louis, Mo. 63124
Filed June 27, 1975, Ser. No. 591,036
Term of patent 14 years
Int. Cl. D30—*03*
U.S. Cl. D30—15

245,350
PET HARNESS
Catherine P. Geary, 438 Majorca Ave., Coral Gables, Fla. 33134
Filed Feb. 9, 1976, Ser. No. 656,449
Term of patent 14 years
Int. Cl. D30—*04*
U.S. Cl. D30—38

245,351
REMEMBRANCE PLAQUE
Edward M. Hyde, 540 Buhl Blvd., and George A. Kraynak, 409 N. Hermitage Road, both of Sharon, Pa. 16146
Filed May 24, 1976, Ser. No. 689,151
Term of patent 14 years
Int. Cl. D20—*03;* D31—*00*
U.S. Cl. D31—13

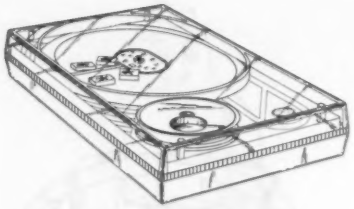


245,352
MULTICHANNEL AUTOMATED APPARATUS FOR ANALYSIS OF CHEMICAL SAMPLES
John J. Moran, Houston, Tex., assignor to Hycel, Inc., Houston, Tex.
Filed Aug. 11, 1976, Ser. No. 713,401
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D24—1.1

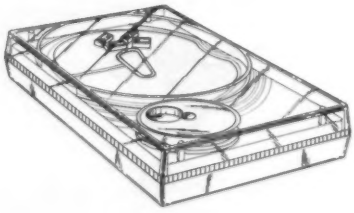


245,353
DOLL
Ann S. Haapanen, 5 Halco Drive, Paramus, N.J. 07652
Filed Mar. 4, 1976, Ser. No. 663,720
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—4 R

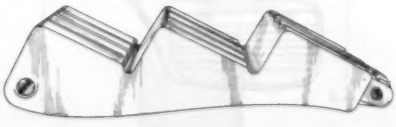
245,354
POCKET RACING GAME BOX
Arisuke Yamagata, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan
Filed Aug. 13, 1975, Ser. No. 604,096
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 CC



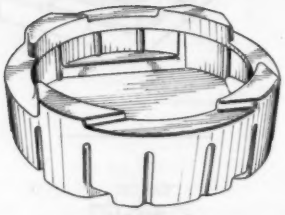
245,355
POCKET RACING GAME BOX
Arisuke Yamagata, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan
Filed Aug. 13, 1975, Ser. No. 604,315
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 CC



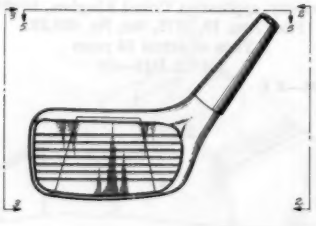
245,356
COMBINED PLAY STEPS AND SLIDE
Kenneth Peter Burgess, Kew Surrey, and Timothy Sefton Elsdale, London, both of England, assignors to WCB Containers Limited
Claims priority, application United Kingdom, 969943
Filed Aug. 19, 1975, Ser. No. 605,893
Term of patent 14 years
Int. Cl. D21—*03*
U.S. Cl. D34—5 E



245,357
SAND OR WATER PLAY DRUM
Kenneth Peter Burgess, Kew Surrey, and Timothy Sefton Elsdale, London, both of England, assignors to WCB Containers Limited
Filed Aug. 19, 1975, Ser. No. 605,898
Term of patent 14 years
Int. Cl. D21—*03*
U.S. Cl. D34—5 F

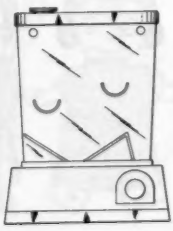


245,358
GOLF CLUB WOOD HEAD
Jerry Barber, P.O. Box 550, La Canada, Calif. 91011
Filed Oct. 8, 1975, Ser. No. 620,696
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH

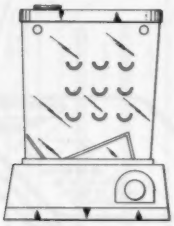


245,359
TABLE-TYPE GAME APPARATUS
William F. Wilke, 702 N. Minnesota St., Carson City, Nev. 89701
Filed Oct. 15, 1975, Ser. No. 622,713
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 J

245,360
WATER GAME CASE
Shizuka Kojima, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan
Filed Mar. 12, 1976, Ser. No. 666,308
Claims priority, application Japan, Dec. 12, 1975, 50-49253
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 JJ



245,361
WATER GAME CASE
Shizuka Kojima, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan
Filed Mar. 12, 1976, Ser. No. 666,427
Claims priority, application Japan, Dec. 12, 1975, 50-49255
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 JJ



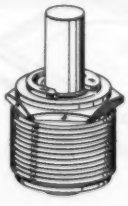
245,362
SAVINGS BANK OR THE LIKE
Leonard Patsiner, York, Pa., assignor to Mar-Lyn Imports, Inc.
Filed Feb. 24, 1976, Ser. No. 660,830
Term of patent 14 years
Int. Cl. D31—*00*
U.S. Cl. D34—11 R

245,363
BALANCING TOY
George David Wichodil, 2321 Pamela Lane, Sacramento, Calif. 95825
Filed June 12, 1975, Ser. No. 539,438
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 N

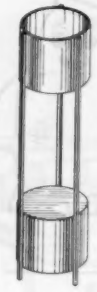
245,364
TOY REFRIGERATOR
Joseph M. McClary, Brentwood, Tenn., assignor to Kusan, Inc., Nashville, Tenn.
Filed Apr. 14, 1976, Ser. No. 675,534
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AC

245,365
TOY BIRD
Masami Shirashi, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan
Filed May 10, 1976, Ser. No. 684,843
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 C

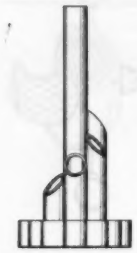
245,366
BEARING UNIT FOR MECHANICAL MEASURING DEVICES
Sture Berglund, Tyreso, Sweden, assignor to Alfredeen Production AB, Bandhagen, Sweden
Filed Sept. 26, 1975, Ser. No. 617,020
Claims priority, application Sweden, Apr. 3, 1975, 75679
Term of patent 14 years
Int. Cl. D15—*99*
U.S. Cl. D15—143



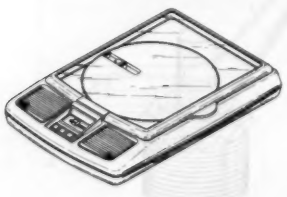
245,367
LUMINAIRE HOUSING
Kurt Franck, Newark, Ohio, assignor to Johns-Manville Corporation, Denver, Colo.
Filed May 27, 1975, Ser. No. 581,328
Term of patent 14 years
Int. Cl. D26—*06*
U.S. Cl. D48—20 A



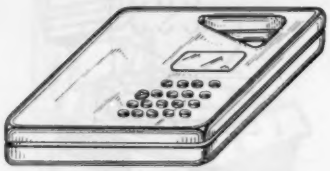
245,368
LAMP BASE
Harry E. Mueller, 2149 Delmar, Granite City, Ill. 62040
Filed Aug. 11, 1976, Ser. No. 713,288
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—20 R



245,369
AUDIO-VISUAL SHEET PLAYER
Hideto Furuoka, Tokyo, Japan, assignor to Gakken Co., Ltd., Tokyo, Japan
Filed Apr. 30, 1975, Ser. No. 573,052
Claims priority, application Japan, Mar. 10, 1975, 50-9041
Term of patent 14 years
Int. Cl. D14—*01, 99*
U.S. Cl. D14—20

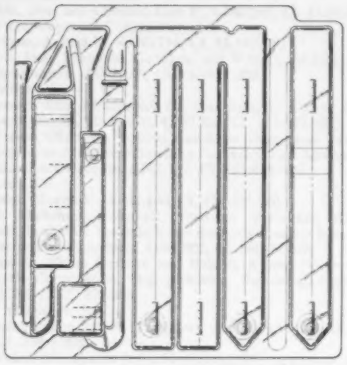


245,370
CALCULATOR OR SIMILAR ARTICLE
Hisashi Maeda, Nagaokakyo, and Hironori Yoshikawa, Hirakata, both of Japan, assignors to Al Nyman & Son, Inc., Miami Springs, Fla.
Filed Mar. 19, 1975, Ser. No. 559,773
Claims priority, application Japan, Oct. 18, 1974, 49-36591
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D64—11 B

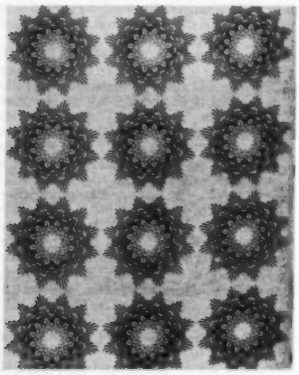


245,371
KEY HOLDER CARD
William B. Mowry, 9118 W. 70th St., Shawnee Mission, Kans. 66204
Filed Feb. 2, 1976, Ser. No. 654,072
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—8

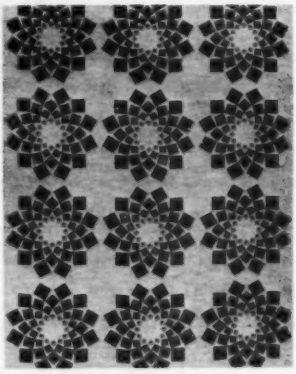
245,372
UNDERWATER DRAINAGE DEVICE WITH DUAL COLLECTION CHAMBERS
Leonard D. Kurtz, Woodmere, and Robert E. Bidwell, Melville, both of N.Y., assignors to Deknatel, Inc.
Filed Apr. 7, 1976, Ser. No. 674,748
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—59



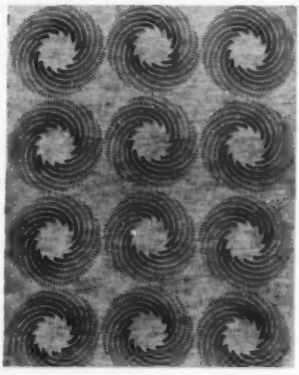
245,373
UPHOLSTERY FABRIC OR THE LIKE
Verner Panton, Binningen, Switzerland, assignor to MIRA-X S.A. Suhr, Suhr, Switzerland
Filed Mar. 26, 1975, Ser. No. 562,372
Claims priority, application Switzerland, Dec. 27, 1974, 60138/74
Term of patent 14 years
Int. Cl. D6—*13*
U.S. Cl. D92—1 T



245,374
UPHOLSTERY FABRIC OR THE LIKE
Verner Panton, Binningen, Switzerland, assignor to MIRA-X S.A. Suhr, Suhr, Switzerland
Filed Mar. 26, 1975, Ser. No. 562,373
Claims priority, application Switzerland, Dec. 27, 1974, 60138/74
Term of patent 14 years
Int. Cl. D6—*13*
U.S. Cl. D92—1 T



245,375
UPHOLSTERY FABRIC OR THE LIKE
Verner Panton, Binningen, Switzerland, assignor to MIRA-X S.A. Suhr, Suhr, Switzerland
Filed Mar. 26, 1975, Ser. No. 562,374
Claims priority, application Switzerland, Dec. 27, 1974, 60138/74
Term of patent 14 years
Int. Cl. D6—*13*
U.S. Cl. D92—1 P



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 9TH DAY OF AUGUST, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. B. Dick/Scott: *See*—
Plumadore, John D., 4,041,312, Cl. 250-315.00R.

A/S Hoyer-Ellefsen: *See*—
Eide, Ove; and Clausen, Carl F., 4,040,263, Cl. 61-86.000.

A & T Development Corporation: *See*—
Grosse, Aristid V., 4,040,216, Cl. 52-169.130.

Abblard, Jean; Marmain, Georges; and Viricel, Andree, to Philagro. Diphosphorous. 4,041,109, Cl. 260-927.00R.

Abe, Seikou: *See*—
Tanaka, Eizi; Mochizuki, Hiroshi; Kosuda, Tooru; Abe, Seikou; and Ohashi, Michihiro, 4,040,405, Cl. 123-139.0BG.

Abe, Tatsuo; Okamoto, Toshiki; Sakakura, Takao; and Tateno, Tatsuo, to Sumitomo Aluminum Smelting Company, Ltd. Method of producing aluminum fluoride. 4,041,137, Cl. 423-489.000.

Abic Ltd.: *See*—
Stolar, Morris E., 4,041,160, Cl. 424-229.000.

Aboshi, Michihiro; Kakutani, Tsutomu; Yoshitake, Katsumi; and Koseki, Toshinori, to Asahi Kasei Kogyo Kabushiki Kaisha. Thermoplastic resin composition. 4,041,002, Cl. 260-30.60R.

Abramowitz, Philip Herbert; and Balliett, Robert Wayne, to St. Joe Minerals Corporation. High-precision, fine-detail forging process. 4,040,286, Cl. 72-377.000.

Abura, Yoshinori: *See*—
Wada, Yukio; Abura, Yoshinori; and Matsui, Takeshi, 4,040,696, Cl. 339-8.00R.

Acda, Petrus Marinus, to Polva Nederland,BV. Apparatus for manufacturing an electrowelding component of synthetic material comprising a resistance element. 4,040,889, Cl. 156-498.000.

ACF Industries, Incorporated: *See*—
Carle, Ross G.; and Reinhardt, James R., 4,040,523, Cl. 213-46.00R.
Walk, Howard J.; and Rollins, Dallas W., 4,040,363, Cl. 105-377.000.

Achsel, Eberhard; Hortig, Hans-Peter; Seipp, Heinrich; and Giller, Heinz, to Hoechst Aktiengesellschaft. Apparatus for the purification of terephthalic acid dimethyl ester. 4,040,793, Cl. 23-273.00R.

ACS Industries, Inc.: *See*—
Botvin, George B., 4,040,139, Cl. 15-209.00B.

Adams, Ralph Delta; and Ingram, Charles Junior, to Cubic-Western Data. Ticket advance and printer mechanism. 4,040,345, Cl. 101-66.000.

Adams, Sally Lee: *See*—
Persinski, Leonard J.; Martin, Fred David; and Adams, Sally Lee, 4,040,854, Cl. 106-90.000.

Addressograph Multigraph Corporation: *See*—
Foote, Francis C., 4,041,279, Cl. 235-61.70B.
Nielsen, Asger Torben, 4,040,722, Cl. 350-161.00W.

Adelmann, Siegfried; Margotte, Dieter; Vernaleken, Hugo; Niederprum, Hans; Meussdoerffer, Johann Nikolaus; and Nouvertne, Werner, to Bayer Aktiengesellschaft. Process for molding aromatic polycarbonates having perfluoroalkanesulphonic acid derivatives as mold release agents. 4,041,003, Cl. 260-30.80R.

Adinolfi, Rocco J., to Gillette Company, The. Hair styling tool. 4,040,432, Cl. 132-9.000.

AEP-International Ltd.: *See*—
Haskell, Harry Ainsworth, 4,041,329, Cl. 307-247.00A.

Agence Nationale de Valorisation de la Recherche (ANVAR): *See*—
Armand, Michel B., 4,041,220, Cl. 429-191.000.
Francois, Bernard; Vernois, Michel; Martin, Paul; and Franta, Emile, 4,040,815, Cl. 75-.50B.

Agency of Industrial Science and Technology: *See*—
Otaki, Hideyuki, 4,040,327, Cl. 85-46.000.

Agrimatic Corporation: *See*—
Miller, Gary E., 4,040,388, Cl. 119-1.000.

Agusa, Kazuo: *See*—
Akahide, Kozo; and Agusa, Kazuo, 4,041,270, Cl. 219-73.00R.

Ahaus, Gerhard; Netzer, Siegfried; and Liebig, Hans-Peter, to WABCO Westinghouse GmbH. Fluid pressure operable brake apparatus with load-compensating means for vehicles with tandem rear axles. 4,040,673, Cl. 303-6.00C.

Air Preheater Company, Inc., The: *See*—
Stockman, Richard Franklin; and Baker, Roderick Jay, 4,040,475, Cl. 165-9.000.
Wheeler, Lewis Halsay, 4,040,473, Cl. 165-5.000.

Air Products and Chemicals, Inc.: *See*—
Bechara, Ibrahim S.; Carroll, Felix P.; Holland, Dewey G.; and Mascioli, Rocco L., 4,040,992, Cl. 260-2.5AW.

Airco, Inc.: *See*—
Grover, Vijay K.; and Zachry, Woodie, 4,040,714, Cl. 339-264.00R.

Aircraft Mechanics, Inc.: *See*—
Pearne, Frank S.; Pearne, Florentin J.; Osborn, William P.; King, Terance M.; and Guzzetta, Joseph A., 4,040,532, Cl. 214-152.000.

Airflow Developments Limited: *See*—
Wilson, Alexander Connor, 4,040,293, Cl. 73-211.000.

Aisin Seiki Kabushiki Kaisha: *See*—
Isogai, Mitsuyuki; Tikusa, Kouiti; and Nakamura, Yosihiko, 4,040,162, Cl. 29-420.500.

Aizawa, Tatsuo: *See*—
Washio, Takaji; Sasaki, Koichi; and Aizawa, Tatsuo, 4,040,387, Cl. 118-658.000.

Ajinomoto Co., Inc.: *See*—
Uchio, Ryosuke; Kikuchi, Kenji; Asai, Soichiro; and Yarita, Kenichi, 4,040,906, Cl. 195-36.00R.

Akahide, Kozo; and Agusa, Kazuo, to Kawasaki Steel Corporation. Methods of welding corner joints. 4,041,270, Cl. 219-73.00R.

Akamatsu, Takashi: *See*—
Yamada, Eiji; Ito, Hiroaki; and Akamatsu, Takashi, 4,041,051, Cl. 260-373.000.

AKDOV Animal Health Care Products, Inc.: *See*—
Kuhn, Burt L., 4,040,422, Cl. 128-223.000.

Albany International Corporation: *See*—
Miessler, James D.; and Johnson, Arne I., 4,040,165, Cl. 29-458.000.

Albatex A.G.: *See*—
Genini, Graziano, 4,040,454, Cl. 139-448.000.

Alberny, Robert; and Vedda, Louis, to Institut des Recherches de la Siderurgie Francaise. Continuous-casting system with electro-magnetic mixing. 4,040,467, Cl. 164-49.000.

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Albrecht, Konrad; Frensch, Heinz; and Hartel, Kurt, to Hoechst Aktiengesellschaft. Fungicidal dispersions of carboxylic acid amides. 4,041,164, Cl. 424-263.000.

Albright, James A.; and Lindvay, Michael W., to Velsicol Chemical Corporation. Acrylate esters of dihaloneopentyl glycol phosphates (phosphorinanes) and their use as flame retardants. 4,041,012, Cl. 260-45.80A.

Alburn, Harvey E.: *See*—
Dvonch, William; and Alburn, Harvey E., 4,041,037, Cl. 260-256.40C.

Alcan Research and Development Limited: *See*—
Chandler, John Leslie, 4,040,954, Cl. 210-42.00R.

Alexandre, Philippe, to Societe Generale de Constructions Electriques et Mecaniques Alsthom. Valve seat construction for valves for controlling the pressure of liquids. 4,040,442, Cl. 137-543.170.

Alfredeen Production AB: *See*—
Berglund, Sture, 4,040,685, Cl. 308-189.00R.

Allaire, John O.: *See*—
Van Vonno, Nicolaas C.; and Allaire, John O., 4,040,997, Cl. 260-23.0XA.

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Kouchich, Allan; and Taylor, George W., 4,041,436, Cl. 338-21.000.

Allen, John K.; and Bertolacini, Ralph J., to Standard Oil Company a corporation of Indiana. Process for the isomerization of dimethylnaphthalenes using a mordenite/alumina catalyst. 4,041,089, Cl. 260-668.00A.

Alliance Manufacturing Company, Inc., The: *See*—
Deming, Andrew F., 4,041,259, Cl. 200-46.000.

Allied Chemical Corporation: *See*—
Libowitz, George G., 4,040,410, Cl. 126-270.000.
Weiss, William Robert; Saich, Anthony Michael; and Cooksey, James Judson, 4,040,782, Cl. 28-271.000.

Allison, Truman L.: *See*—
Slane, Francis L.; and Allison, Truman L., 4,041,470, Cl. 364-900.000.

Allori, Raymond J.: *See*—
Kestian, Anthony M.; and Allori, Raymond J., 4,040,499, Cl. 180-77.00R.

Alloy Metals, Inc.: *See*—
Stern, Marvin J., 4,040,822, Cl. 75-140.000.

Alloy Surfaces Company, Inc.: *See*—
Baldi, Alfonso L.; and Damiano, Victor V., 4,041,196, Cl. 427-252.000.

Alps Electric Co., Ltd.: *See*—
Noji, Tasuku; and Yasuma, Yoichi, 4,041,422, Cl. 334-49.000.

Alstad, Jorolf; and Farbu, Leif, to Forskningsgruppe for Sjeldne Jordarter. Process for separation of the lanthanides. 4,041,125, Cl. 423-21.000.

Altenburger, Otto; and Dorazio, Alton E., to Stromberg-Carlson Corporation. Bus monitor circuit for detecting malfunction of telephone circuits connected in groups to a common bus. 4,041,253, Cl. 179-175.20R.

Altenhoner, Klaus; Jansen, Walter; Knop, Klaus; Pohl, Ulrich; and

Reerink, Jan G., to Thyssen Purofer GmbH. Process for the production of sponge iron. 4,040,816, Cl. 75-35.000.
Amax Resource Recovery Systems, Inc.: *See*—
Jones, Dennis A., 4,040,852, Cl. 106-97.000.
Amchem Company Limited: *See*—
Baker, George Edward, 4,041,269, Cl. 219-69.00E.
Amemiya, Kiyosi; and Takida, Hiroshi, to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha. Process for preparing hydrolyzed ethylene-vinyl acetate copolymer having improved heat stability. 4,041,223, Cl. 526-10.000.
Amerace Corporation: *See*—
Obuch, Edward A., 4,040,700, Cl. 339-95.00R.
Waddington, William T.; Jenkins, Harold F.; and Filak, Paul T., 4,040,711, Cl. 339-198.00R.
American Brands, Inc.: *See*—
Ashworth, James G.; Glock, Eugene; Kelly, James G.; McLaughlin, James L.; and Merwin, Owen T., 4,040,431, Cl. 131-140.00P.
American Cyanamid Company: *See*—
Asato, Goro; and Bentley, Terence James, 4,041,070, Cl. 260-553.00A.
Cross, Barrington; and Walworth, Bryant Leonidas, 4,041,046, Cl. 548-375.000.
Los, Marinus, 4,041,045, Cl. 548-302.000.
Matsuda, Ken; and Barber, William Austin, 4,040,980, Cl. 252-463.000.
Milionis, Jerry Peter; and Spicer, Larry Dean, 4,041,151, Cl. 424-78.000.
Roth, Roy William, 4,040,884, Cl. 156-209.000.
Zipperian, Donald Edwin; Jones, James Allen; and Buza, Thomas Brian, 4,040,950, Cl. 209-166.000.
American Hoechst Corporation: *See*—
Van Vonno, Nicolaas C., 4,040,996, Cl. 260-23.0XA.
Van Vonno, Nicolaas C.; and Allaire, John O., 4,040,997, Cl. 260-23.0XA.
American Home Products Corporation: *See*—
Dvonch, William; and Alburn, Harvey E., 4,041,037, Cl. 260-256.40C.
Fenichel, Richard L.; and Levin, Howard J., 4,041,155, Cl. 424-177.000.
American Safety Equipment Corporation: *See*—
Tanaka, Akira; and Ulrich, Charles J., 4,040,664, Cl. 297-389.000.
American Seating Company: *See*—
Barecki, Chester J., 4,040,660, Cl. 297-389.000.
Amor, William H., Jr.; and Steffek, Robert J., to Picker Corporation. Telescopic column for X-ray apparatus. 4,041,320, Cl. 250-523.000.
AMP Incorporated: *See*—
Brown, Leon Richard, 4,040,180, Cl. 29-753.000.
Dola, Frank Peter; and Rossler, Frederick William, Jr., 4,040,709, Cl. 339-125.00L.
Huber, John Henry, 4,040,704, Cl. 339-99.00R.
Huber, John Henry, 4,040,705, Cl. 339-99.00R.
Loose, Winfield Warren, 4,041,547, Cl. 361-410.000.
Sanchez, Miguel Ruiz, 4,040,179, Cl. 29-749.000.
Shaffer, Howard Richard; and Frantz, Robert Houston, 4,040,703, Cl. 339-99.00R.
AMP Incorported: *See*—
Kahn, David; and Geckle, Raymond James, 4,040,808, Cl. 65-33.000.
Ampex Corporation: *See*—
Ryan, Dennis M., 4,040,575, Cl. 242-76.000.
Amphlett, Robert, to Rist's Wires & Cables Limited. Apparatus for assembling a flexible sleeve to a lead. 4,040,178, Cl. 29-745.000.
Amsler, Joachim, to Sprecher & Schuh AG. Contact arrangement for an electrical switch, especially for a vacuum switch. 4,041,262, Cl. 200-144.00B.
Anchor Hocking Corporation: *See*—
Siler, Harold L., Jr.; and Roberts, Cecil P., 4,040,236, Cl. 53-67.000.
Anderson, Arnold L., to Velsicol Chemical Corporation. Plastic compositions. 4,041,013, Cl. 260-45.75R.
Anderson Development Company: *See*—
Meyer, Jeffrey G., 4,041,226, Cl. 526-144.000.
Anderson, Raymond R. Rock windrower. 4,040,490, Cl. 171-63.000.
Anderson, Thomas E.: *See*—
Peak, Steven C.; and Anderson, Thomas E., 4,041,365, Cl. 363-58.000.
Ando, Hirokazu: *See*—
Kawasaki, Masahiro; and Ando, Hirokazu, 4,041,506, Cl. 354-51.000.
Andreev, Anatoly Fedorovich: *See*—
Iodvalkis, Vitautas Jurgio; Nomitsas, Richardas Prano; Andreev, Anatoly Fedorovich; and Grekov, Vladimir Borisovich, 4,041,504, Cl. 354-23.00R.
Andrews, James D., to TRW Inc. Filter assembly for electrochemical machining apparatus. 4,040,933, Cl. 204-224.00M.
Andrews, Ottie H. Wave-pump apparatus. 4,040,257, Cl. 61-20.000.
Angott, Paul G., to Thermotrol Corporation. Thermostat timer. 4,041,325, Cl. 307-141.000.
Anheuser-Busch, Incorporated: *See*—
Stubits, Marcella C.; and Teng, James, 4,041,179, Cl. 426-3.000.
Voigt, John E.; and Bovier, Edward M., 4,040,862, Cl. 127-70.000.
Ankel, Helmut: *See*—
Chany, Charles; Galliot, Brigitte; Chevalier, Marie-Josephe; and Ankel, Helmut, 4,041,152, Cl. 424-85.000.
Anthony, Thomas R.; and Cline, Harvey E., to General Electric Company. High voltage deep diode power semiconductor switch. 4,040,869, Cl. 148-1.500.
Anthony, Thomas R.: *See*—
Chang, Mike F.; Cline, Harvey E.; and Anthony, Thomas R., 4,040,868, Cl. 148-1.500.
Cline, Harvey E.; and Anthony, Thomas R., 4,040,171, Cl. 29-577.000.
Antos, George J., to UOP Inc. Dehydrocyclization with an acidic multimetallic catalytic composite. 4,041,092, Cl. 260-673.500.
Aonuki, Kiichi: *See*—
Watanabe, Haruo; Kitagawa, Toru; Negishi, Masaaki; Aonuki, Kiichi; and Kobayashi, Harunobu, 4,041,059, Cl. 260-424.000.
Applequist, Quintin A.; and Hawley, Laird V., to Roberts Industries, Inc. Adjustable vehicle axle. 4,040,643, Cl. 280-656.000.
Arai, Atsuaki; Shiba, Keisuke; Yamada, Minoru; Furutachi, Nobuo; and Nakamura, Kotaro, to Fuji Photo Film Co., Ltd. Two-equivalent magenta couplers with amido coupling-off groups. 4,040,835, Cl. 96-56.500.
Arai, Atsuaki; Nakamura, Kotaro; Yamada, Minoru; and Furutachi, Nobuo, to Fuji Photo Film Co., Ltd. Silver halide emulsion containing two-equivalent coupler. 4,040,836, Cl. 96-56.500.
Araki, Kenji: *See*—
Nakaoka, Kazuhide; and Araki, Kenji, 4,040,873, Cl. 148-12.00C.
Arco Industries Corporation: *See*—
Olmstead, Clarence W.; and Triquet, Fred E., 4,041,241, Cl. 174-153.00G.
Arctic Enterprises, Inc.: *See*—
Peterson, Edward W.; and Bednar, Charles J., 4,040,693, Cl. 312-236.000.
Arfelt, Soren Christian Schoubye; Clausen, Ib Christian; Jensen, Johannes; Fynbo, Knud Hansen; and Fischer, Jean Arnold, to Daempa A/S. Door lock. 4,040,652, Cl. 292-167.000.
Argabright, Perry A.; and Presley, C. Travis, to Marathon Oil Company. Method of consolidating particles. 4,040,258, Cl. 61-36.00C.
Argade, Shyam D.; Bortak, John J.; Collins, Stephen M.; and Weissman, Eugene Y., to BASF Wyandotte Corporation. Protective covering for electrolytic filter press cell frames. 4,040,935, Cl. 204-256.000.
Ariss, Stephen Arthur: *See*—
Burrows, Ian Edward; Cheney, Peter Arthur; and Ariss, Stephen Arthur, 4,041,181, Cl. 426-55.000.
Ariyan, Zaven S.: *See*—
Moser, Robert E.; Powers, Larry J.; and Ariyan, Zaven S., 4,041,167, Cl. 424-270.000.
Armand, Michel B., to Agence Nationale de Valorisation de la Recherche (ANVAR). Mixed conductors of graphite, processes for their preparation and their use, notably for the production of electrodes for electrochemical generators, and new electrochemical generators. 4,041,220, Cl. 429-191.000.
Armco Steel Corporation: *See*—
Lyke, Richard F., 4,041,377, Cl. 324-34.0MA.
Neilon, Claude R., 4,040,264, Cl. 61-86.000.
Armour-Dial, Inc.: *See*—
Steinhauer, Roger C.; and Bertozzi, Richard J., 4,040,966, Cl. 252-8.800.
Arnold, Addie M. Food tray for automobiles. 4,040,659, Cl. 297-194.000.
Arnold, John Spencer, to Plessey Handel und Investments AG. Data processing systems. 4,041,464, Cl. 364-200.000.
Arnold, Ruben Robert. Emergency locator system for locating and retrieving sunken vessels. 4,040,135, Cl. 9-9.000.
Arnoldi, Hugh; and Salvatore, Leonard Robert, to RCA Corporation. Transistor circuit. 4,041,388, Cl. 324-158.00T.
Aro Corporation, The: *See*—
Clifford, Earl W., 4,040,428, Cl. 128-351.000.
Arpe, Hans-Jurgen; and Hey, Hansjorg, to Hoechst Aktiengesellschaft. Process for preparing 2-ethyl-pyridine. 4,041,039, Cl. 260-290.00R.
Aryamane, Avinash P.: *See*—
Williamson, Harold L.; and Aryamane, Avinash P., 4,040,175, Cl. 29-623.000.
Asahi Kasei Kogyo Kabushiki Kaisha: *See*—
Aboshi, Michihiro; Kakutani, Tsutomu; Yoshitake, Katsumi; and Koseki, Toshinori, 4,041,002, Cl. 260-30.60R.
Asahi Kogaku Kogyo Kabushiki Kaisha: *See*—
Kawasaki, Masahiro; and Ando, Hirokazu, 4,041,506, Cl. 354-51.000.
Asai, Soichiro: *See*—
Uchio, Ryosuke; Kikuchi, Kenji; Asai, Soichiro; and Yarita, Kenichi, 4,040,906, Cl. 195-36.00R.
Asato, Goro; and Bentley, Terence James, to American Cyanamid Company. Tetrahydro-4-imino-1-naphthylureas. 4,041,070, Cl. 260-553.00A.
Asea Aktiebolag: *See*—
Grune, Per Olof, 4,041,264, Cl. 200-148.00R.
Ashworth, James G.; Glock, Eugene; Kelly, James G.; McLaughlin, James L.; and Merwin, Owen T., to American Brands, Inc. Method of increasing the filling capacity of shredded tobacco tissue. 4,040,431, Cl. 131-140.00P.
Assandri, Alessandro; Lancini, Giancarlo; Volpe, Giancarlo; and Cavalleri, Bruno, to Gruppo Lepetit S.p.A. Nitroimidazole derivative with antibacterial activity. 4,041,168, Cl. 424-273.000.
Asselin, Andre A.: *See*—
Demerson, Christopher A.; Humber, Leslie G.; Asselin, Andre A.; Jirkovsky, Ivo; and Dobson, Thomas A., 4,041,169, Cl. 424-274.000.
Assenmacher, Gerhard. Method and fixture for reaming piston pin bushings in connecting rods. 4,040,763, Cl. 408-1.00R.

Atchley, Gary S.: *See*—
Hatcher, Charles S.; and Atchley, Gary S., 4,040,153, Cl. 28-221.000.

Atkins, Frederick Joseph; and Keene, Henry Rich, to Edson Corporation, The. Boat steering system. 4,040,375, Cl. 114-160.000.

Atlantic Pipe Corporation: *See*—
Ottmann, Norman; and Strever, Walter, 4,041,118, Cl. 264-71.000.

Atlantic Richfield Company: *See*—
Richards, Lawrence M., 4,040,480, Cl. 166-57.000.
Washall, Thomas A., 4,041,139, Cl. 423-508.000.
Zehner, Lee R.; and Zajacek, John G., 4,041,067, Cl. 260-485.00R.
Zehner, Lee R.; and Zajacek, John G., 4,041,068, Cl. 260-485.00R.

Atsukawa, Masumi; Kamei, Kazumi; Shinoda, Naoharu; and Ushio, Hiroyuki, to Mitsubishi Jukogyo Kabushiki Kaisha. Wet waste flue gas desulfurizing process using lime as absorbent. 4,040,803, Cl. 55-73.000.

Auburn Research Foundation: *See*—
Goodling, John S.; McDaniel, Gayner R.; and Steadham, Richard A., 4,040,425, Cl. 128-303.140.

August Thyssen-Hutte AG: *See*—
Voss, Eitel; Waldofner, Karl-Heinz; and Harz, Kurt, 4,040,789, Cl. 23-230.00A.

Ault, Earl R.; Stevens, Philip C.; Sipman, Robert H.; and Bradford, Robert S., Jr., to Northrop Corporation. Coaxial electron beam pumped laser. 4,041,415, Cl. 331-94.5PE.

Austin, Robert Roy; and Tyson, George Noblit. Apparatus for generation of carbon dioxide gas and the carbonation of water. 4,040,342, Cl. 99-323.100.

Auto Restraint Systems Limited: *See*—
Giffen, William McAlpin; Pollitt, John Michael; and Clifford, Roy, 4,040,645, Cl. 280-745.000.

Automobiles Peugeot: *See*—
Leichle, Claude, 4,040,397, Cl. 123-32.0AE.

Autotype Company Limited, The: *See*—
Hepher, Martin; Sperry, John Arthur; and Stewart, Malcolm John, 4,041,204, Cl. 428-199.000.

Avco Corporation: *See*—
Webb, George, 4,040,358, Cl. 102-79.000.

Avenia, Richard William; Christenson, James Gordon; and Pecherer, Benjamin, to Hoffmann-La Roche Inc. Immunoassay for pharmacologically active phenethylamines. 4,041,076, Cl. 260-559.00A.

Avtex Fibers Inc.: *See*—
Smith, Frederick R., 4,041,121, Cl. 264-191.000.

Axelrod, Shoya Samuilovich; Belozerov, Viktor Grigorievich; Gershman, Mikhail Bentsionovich; Margolin, Evel Grigorievich; and Shapot, Mikhail Borisovich. Separator for alkaline storage batteries. 4,041,218, Cl. 429-136.000.

Ayerst McKenna and Harrison Ltd.: *See*—
Demerson, Christopher A.; Humber, Leslie G.; Asselin, Andre A.; Jirkovsky, Ivo; and Dobson, Thomas A., 4,041,169, Cl. 424-274.000.

B. F. Goodrich Company, The: *See*—
Hess, Nelson Claire, 4,040,380, Cl. 116-34.00R.
Rajput, Yudh Vir, 4,040,676, Cl. 303-92.000.

Bach, Ricardo O.; and Morrison, Robert C., to Lithium Corporation of America. Recirculation telomerization process and its liquid telomers and liquid telomers produced thereby. 4,041,088, Cl. 260-668.00B.

Bacha, John D.; and Selwitz, Charles M., to Gulf Research & Development Company. Process for inhibiting the polymerization of styrene. 4,040,911, Cl. 203-9.000.

Baillargeon, John L.; and Clifford, Leonard W., to Eltra Corporation. Ignition breaker point arrangement. 4,040,406, Cl. 123-146.50A.

Baker, George Edward, to Amchem Company Limited. Cartridge for an electrical discharge machining apparatus. 4,041,269, Cl. 219-69.00E.

Baker, Philip G.; and Johnson, Bruce K., to Polaroid Corporation. Unicell photometer device. 4,040,751, Cl. 356-225.000.

Baker, Roderick Jay: *See*—
Stockman, Richard Franklin; and Baker, Roderick Jay, 4,040,475, Cl. 165-9.000.

Baldi, Alfonso L.; and Damiano, Victor V., to Alloy Surfaces Company, Inc. Diffusion treatment of metal. 4,041,196, Cl. 427-252.000.

Balliett, Robert Wayne: *See*—
Abramowitz, Philip Herbert; and Balliett, Robert Wayne, 4,040,286, Cl. 72-377.000.

Baltz, John; and Coltrinari, Enzo, to PGP Industries, Inc. Separation and selective recovery of platinum and palladium by solvent extraction. 4,041,126, Cl. 423-22.000.

Bamburg, Robert A.; Duncan, Farris N.; and Floyd, Roger M., to Olinkraft, Inc. Combination shipping and storage container and method. 4,040,558, Cl. 229-23.0BT.

Ban, Masaaki: *See*—
Furuto, Yoshio; and Ban, Masaaki, 4,041,376, Cl. 324-33.000.

Baratoff, Paul, to Korfund Dynamics Corporation. Vibration isolator with integral non-amplifying seismic restraint. 4,040,590, Cl. 248-358.0AA.

Barber-Colman Company: *See*—
Trost, Wayne C.; and Capps, John B., 4,040,451, Cl. 139-48.000.

Barber, William Austin: *See*—
Matsuda, Ken; and Barber, William Austin, 4,040,980, Cl. 252-463.000.

Bardotti, Angelo; and Pederzini, Renzo, to Honeywell Information Systems Italia. Computer input/output control apparatus. 4,041,473, Cl. 364-900.000.

Barecki, Chester J., to American Seating Company. Adjustable back seat with reduced moment arm. 4,040,660, Cl. 297-389.000.

Bargar Metal Fabricating Company: *See*—
Penczak, John P., 4,041,238, Cl. 174-48.000.

Barie, Walter P., Jr.; Onopchenko, Anatoli; and Schulz, Johann G. D., to Gulf Research & Development Company. Polyepoxy-3,3',4,4'-benzhydrol tetracarboxylic dianhydride laminating resins. 4,041,004, Cl. 260-32.8EP.

Barigot, Jean-Claude: *See*—
Gauriat, Gilles; Vernezy, Jacques; and Barigot, Jean-Claude, 4,041,392, Cl. 325-38.00A.

Barlow, Charles Brian, to Imperial Chemical Industries Limited. Compositions and methods for combating insect pests or fungal pests of plants. 4,041,172, Cl. 424-304.000.

Barlow, Gordon A.; and Isaacson, Anson, to Marvin Glass & Associates. Simulated volleyball game apparatus. 4,040,621, Cl. 273-85.00C.

Bartch, Donald Walter: *See*—
Deal, Samuel Broughton; and Bartch, Donald Walter, 4,041,347, Cl. 313-450.000.

BASF Aktiengesellschaft: *See*—
Maier, Karl; Hansen, Guenter; and Kermer, Wolf-Dieter, 4,041,025, Cl. 260-158.000.
Schoeppl, Hubert; Petersen, Harro; Paulus, Gerhard; and Queins, Hubertus, 4,041,222, Cl. 526-6.000.

BASF Wyandotte Corporation: *See*—
Argade, Shyam D.; Bortak, John J.; Collins, Stephen M.; and Weissman, Eugene Y., 4,040,935, Cl. 204-256.000.

Basila, Michael R.; and Broersma, Frank R., to Nalco Chemical Company. Ozonization catalyst. 4,040,982, Cl. 252-466.00J.

Bastron, Victor C.: *See*—
Behrmann, William C.; Turner, Earl E.; and Bastron, Victor C., 4,041,100, Cl. 260-683.470.

Batozsky, Vadim Ivanovich: *See*—
Makeev, Boris Anatolievich; Stepochkin, Lev Mikhailovich; Korot, Garri Moiseevich; Batozsky, Vadim Ivanovich; Khodorov, Alexandr Iosifovich; Zhuravlev, Vitaly Ivanovich; and Eremenko, Adolf Grigorievich, 4,040,318, Cl. 83-71.000.

Battelle Development Corporation: *See*—
Henager, Charles H., 4,040,220, Cl. 52-259.000.

Battelle Memorial Institute: *See*—
Moore, Raymond H., 4,041,142, Cl. 423-573.00G.

Baturka, Walter, to Houdaille Industries, Inc. Tool holder. 4,040,764, Cl. 408-59.000.

Baud, Michael F.; and Harvey, Jay A., to Great Lakes Carbon Corporation. Method for the manufacture of carbon-carbon composites. 4,041,116, Cl. 264-29.500.

Bauer, Carl F.; Welsh, Lawrence B.; Youtsey, Karl J.; and Szofran, Frank R., to Universal Oil Products Company. Oxygen sensor having thin film electrolyte. 4,040,929, Cl. 204-195.00S.

Bauer, Peter W.; and Paulson, Merle R., to United States of America, Navy. Satellite up link diversity switch. 4,041,397, Cl. 325-304.000.

Bauer, Timothy R.: *See*—
Horton, Robert A.; and Bauer, Timothy R., 4,040,466, Cl. 164-17.000.

Bauer, Werner, to International Standard Electric Corporation. Voltage multiplier arrangement. 4,041,366, Cl. 363-61.000.

Baughn, Charles O.: *See*—
Brown, William E.; Baughn, Charles O.; and Linkenheimer, Wayne H., 4,041,175, Cl. 424-311.000.

Baxter, Robert F. Utility system wall safe. 4,040,365, Cl. 109-50.000.

Baxter, Robert Olin; and Rothschild, Arthur Louis, III, to International Paper Company. Dunnage bag. 4,040,526, Cl. 214-10.50D.

Baxter Travenol Laboratories, Inc.: *See*—
Stockdale, Douglas P.; Mencarini, Richard; Deaton, Carlton D.; and Owen, Ralph M., 4,040,234, Cl. 53-38.000.

Bayer Aktiengesellschaft: *See*—
Adelmann, Siegfried; Margotte, Dieter; Vernaleken, Hugo; Niederprum, Hans; Meussdoerffer, Johann Nikolaus; and Nouvertne, Werner, 4,041,003, Cl. 260-30.80R.
Binsack, Rudolf; and Vernaleken, Hugo, 4,041,018, Cl. 260-75.00R.
Herzog, Helmut; Bien, Hans-Samuel; and Hohmann, Walter, 4,041,053, Cl. 260-381.000.
Kyri, Hans; Brandle, Karl; Muller, Martin; and Heine, Heinrich, 4,040,850, Cl. 106-87.000.
Mansmann, Manfred; and Rambold, Wolfgang, 4,040,860, Cl. 106-302.000.
Maurer, Fritz; Riebel, Hans-Jochem; Hammann, Ingeborg; and Stendel, Wilhelm, 4,041,158, Cl. 424-212.000.
Sirrenberg, Wilhelm; Schramm, Jurgen; Klauke, Erich; Hammann, Ingeborg; and Stendel, Wilhelm, 4,041,177, Cl. 424-322.000.
Ullrich, Martin, 4,040,607, Cl. 259-192.000.
Wolfrum, Gerhard; and Otten, Hans-Gunter, 4,041,024, Cl. 260-158.000.

Baylor, John M.: *See*—
Schuck, Paul R.; and Baylor, John M., 4,040,261, Cl. 61-72.600.

Bayne, Richard L.: *See*—
Pecoraro, George A.; and Bayne, Richard L., 4,040,809, Cl. 65-182.00R.

BBC Brown Boveri & Company Limited: *See*—
Schroder, Dierk, 4,041,370, Cl. 323-8.000.

Beard, Hobert M., Jr.: *See*—
Pacifici, James G.; Newland, Gordon C.; and Beard, Hobert M., Jr., 4,040,923, Cl. 204-159.150.

Beaven, Herbert R., Jr.; and Roberts, Daniel M., to Rockwell International Corporation. Paper moving mechanism. 4,040,511, Cl. 197-133.00R.

Bechara, Ibrahim S.; Carroll, Felix P.; Holland, Dewey G.; and Masci-

oli, Rocco L., to Air Products and Chemicals, Inc. Catalysis of organic isocyanate reactions. 4,040,992, Cl. 260-2.5AW.
Beck, Gerald Helmut: *See*—
Albertson, Kenneth Ray; and Beck, Gerald Helmut, 4,040,636, Cl. 277-188.00A.
Becker, Burckhard, to Volkswagenwerk Aktiengesellschaft. Safety steering column with a deforming element. 4,040,646, Cl. 280-750.000.
Becton, Dickinson and Company: *See*—
Young, H. Theodore, 4,040,421, Cl. 128-218.00N.
Bednar, Charles J.: *See*—
Peterson, Edward W.; and Bednar, Charles J., 4,040,693, Cl. 312-236.000.
Beeler, Alfred; and van der Mijden, Wilhelmus Marinus Cornelius, to U.S. Philips Corporation. Method of manufacturing an electrical contact. 4,040,177, Cl. 29-630.00C.
Beeman, Robert Herbert; and Tarr, Lloyd Arthur, to GTE Automatic Electric Laboratories Incorporated. Tone detection synchronizer. 4,041,248, Cl. 179-84.0VF.
Beeson, Robert M.: *See*—
Cota, Dan E.; Charter, Ted R.; Beeson, Robert M.; and Kinkead, Robin D., 4,041,467, Cl. 364-900.000.
Begg, John Robert William, to British Leyland UK Limited. Vehicle chassis. 4,040,640, Cl. 280-106.00R.
Behringwerke Aktiengesellschaft: *See*—
Bohn, Hans, 4,041,021, Cl. 260-112.00B.
Behrmann, William C.; Turner, Earl E.; and Bastron, Victor C., to Exxon Research and Engineering Company. Catalytic alkylation utilizing olefinic, conjugated cyclic hydrocarbons as promoter therein. 4,041,100, Cl. 260-683.470.
Beitel, Sydney B.: *See*—
Francisco, Herbert H.; Martocci, Anthony P.; and Beitel, Sydney B., 4,041,273, Cl. 219-121.0EM.
Belcher, Donald Keith, to Harris Corporation. RF level detector. 4,041,410, Cl. 330-129.000.
Bell & Howell Company: *See*—
Hartmann, Rudolf, 4,041,505, Cl. 354-25.000.
Parker, Robert R., 4,041,538, Cl. 360-67.000.
Scheib, Harold A., 4,040,730, Cl. 352-192.000.
Bell, Richard A.: *See*—
Wallace, Earl C.; and Bell, Richard A., 4,040,665, Cl. 297-417.000.
Bell Telephone Laboratories, Incorporated: *See*—
Bjorklund, Gary Carl; and Liao, Paul Foo-Hung, 4,040,718, Cl. 350-147.000.
Briley, Bruce Edwin, 4,041,247, Cl. 179-81.00R.
Burrus, Charles Andrew, Jr.; and Stone, Julian, 4,040,890, Cl. 156-605.000.
Chiapparoli, Richard Samuel, Jr., 4,041,403, Cl. 328-39.000.
Glance, Bernard, 4,041,416, Cl. 331-96.000.
Gressitt, Tillman Johnson, 4,040,701, Cl. 339-99.00R.
Seidel, Harold, 4,040,728, Cl. 331-55.000.
Zarouni, Alfred, 4,041,243, Cl. 179-6.500.
Belleson, James Garman; and Clark, Kendall, to International Business Machines Corporation. Inspection tool. 4,040,745, Cl. 356-167.000.
Belleson, James Garman; and Clark, Kendall, to International Business Machines Corporation. Inspection tool. 4,040,748, Cl. 356-199.000.
Bellingham, Robert Aldred, to Valeron Corporation, The. Machining cross-feed head counterweight system. 4,040,315, Cl. 82-2.00E.
Belozerov, Viktor Grigorievich: *See*—
Axelrod, Shoya Samuilovich; Belozerov, Viktor Grigorievich; Gershman, Mikhail Bentsionovich; Margolin, Evel Grigorievich; and Shapot, Mikhail Borisovich, 4,041,218, Cl. 429-136.000.
Bendix Corporation, The: *See*—
Sanford, Norman R., 4,041,286, Cl. 235-151.300.
Bennemann, Frank: *See*—
Heger, Adolf; Passler, Helmar; and Bennemann, Frank, 4,041,192, Cl. 427-43.000.
Benson, Richard W.; Cherney, Steven D.; and Collier, Everett J., to Procter & Gamble Company, The. Builder system and detergent product. 4,040,988, Cl. 252-532.000.
Bentley, Terence James: *See*—
Asato, Goro; and Bentley, Terence James, 4,041,070, Cl. 260-553.00A.
Berchielli, Aldo S.; and Chireau, Roland F., to Yardney Electric Corporation. Zinc electrodes and methods of making same. 4,041,221, Cl. 429-206.000.
Berg, Albert T., Jr.: *See*—
Langlie, Howard; and Berg, Albert T., Jr., 4,040,604, Cl. 256-10.000.
Berges, David A., to SmithKline Corporation. 7-Acyl-3-(sulfoalkyl substituted oxadiazolylthiomethyl) cephalosporins. 4,041,162, Cl. 424-246.000.
Berglund, Sture, to Alfredeen Production AB. Measuring apparatus. 4,040,685, Cl. 308-189.00R.
Berman, Irwin R.; and Nathan, Ira M. Multi-purpose blood bag. 4,040,959, Cl. 210-78.000.
Bernhard, Horst: *See*—
Esselborn, Reiner; and Bernhard, Horst, 4,040,859, Cl. 106-291.000.
Bertolacini, Ralph J.: *See*—
Allen, John K.; and Bertolacini, Ralph J., 4,041,089, Cl. 260-668.00A.
Bertozzi, Richard J.: *See*—
Steinhauer, Roger C.; and Bertozzi, Richard J., 4,040,966, Cl. 252-8.800.
Bethlehem Steel Corporation: *See*—
Francisco, Herbert H.; Martocci, Anthony P.; and Beitel, Sydney B., 4,041,273, Cl. 219-121.0EM.
Betts, E. Douglas, to Outboard Marine Corporation. Dual stern drive mounting arrangement. 4,040,379, Cl. 115-37.000.
Beveridge, Thomas Anthony, to Fiat-Allis Construction Machinery, Inc. Lubrication system for earth moving equipment. 4,040,505, Cl. 184-6.280.
Bexten, Ludger; Noeske, Heinz; Tummes, Hans; and Cornils, Boy, to Ruhrchemie Aktiengesellschaft. Method for the preparation of pure n-aldehydes. 4,041,081, Cl. 260-601.00R.
Bickel, Hans: *See*—
Kocsis, Karoly; Peter, Heinrich; and Bickel, Hans, 4,041,161, Cl. 424-246.000.
Bien, Hans-Samuel: *See*—
Herzog, Helmut; Bien, Hans-Samuel; and Hohmann, Walter, 4,041,053, Cl. 260-381.000.
Bier, Milan, to United States of America, Health, Education and Welfare. Electrophoretic fractional elution apparatus employing a rotational seal fraction collector. 4,040,940, Cl. 204-299.00R.
Bierbach, Herbert: *See*—
Rudolph, Paul; Bierbach, Herbert; Kupfer, Hans; Hafke, Carl; and Kohlen, Rudolf, 4,040,800, Cl. 48-85.200.
Bihrle, William, Jr. Methods and apparatus for effecting recovery of a high speed aircraft from a condition of incipient or developed spin. 4,040,583, Cl. 244-113.000.
Billings, Roger Evan; and Lynch, Franklin Earl, to Engine Research. Four-cycle rotary engine and method of operation therefor. 4,040,398, Cl. 123-44.00R.
Binder, Walter; Hutter, Josef; Stich, Heinrich; Ruckensteiner, Kurt; Tines, Josef, deceased; by Tines, Antonie, legal representative; and by Schwarz, Heide, legal representative, to Chemie Linz Aktiengesellschaft. Process for the preparation of raw mix for the production of cement and sulphuric acid. 4,040,853, Cl. 106-103.000.
Bindra, Jasjit S.; and Kadin, Saul B., to Pfizer Inc. N-(5-Tetrazolyl)-4-oxo-4H-pyrimido(2,1-b)benzothiazole-3-carboxamide antiallergy agents. 4,041,163, Cl. 424-251.000.
Bingham, Joseph Peter, to RCA Corporation. Television signal processing apparatus including a transversal equalizer. 4,041,531, Cl. 358-37.000.
Binsack, Rudolf; and Vernaleken, Hugo, to Bayer Aktiengesellschaft. Thermoplastic carbonate-modified copolyesters and a process for their preparation. 4,041,018, Cl. 260-75.00R.
Bjorklund, Gary Carl; and Liao, Paul Foo-Hung, to Bell Telephone Laboratories, Incorporated. Polarization rotator based on dispersion due to two-photon transitions. 4,040,718, Cl. 350-147.000.
Blachly, Charles H.: *See*—
Deitz, Victor R.; and Blachly, Charles H., 4,040,802, Cl. 55-71.000.
Black, William Brown, to Refractory Services International Limited. Baking pit furnaces. 4,040,778, Cl. 432-192.000.
Blackwell, Henry Wayne, to Dresser Industries, Inc. Oil well tool with packing means. 4,040,649, Cl. 285-3.000.
Blajda, Raymond S.; Kantenwein, Robert W.; Gaughan, Gerald E.; and Sikra, John F., to United States of America, Army. Discarding frangible rotating band. 4,040,359, Cl. 102-93.000.
Blakeslee, Thomas R., to Logisticon, Inc. Guidance system for lift truck. 4,040,500, Cl. 180-98.000.
Blanchard, Clarence E., to Outboard Marine Corporation. Method and apparatus for installing a marine propulsion device. 4,040,378, Cl. 115-74.000.
Blaw-Knox Food and Chemical Equipment, Inc.: *See*—
Englander, Harlan P.; and Pinkel, Edward B., 4,040,898, Cl. 159-27.00R.
Bleckmann, Hans-Wilhelm, to ITT Industries, Incorporated. Device for utilization in anti-skid control systems. 4,040,677, Cl. 303-95.000.
Bleiberg, Melvin L.; Diamond, Sidney; Rowcliffe, Arthur F.; and Spitznagel, John A., to Westinghouse Electric Corporation. High temperature alloys and members thereof. 4,040,876, Cl. 148-37.000.
Blish, Richard C., II; and Lemons, Kyle Eugene, to Signetics Corporation. Etchants for glass films on metal substrates. 4,040,897, Cl. 156-656.000.
Block, Charles: *See*—
Silverman, Seymour; Costa, Paul F.; and Block, Charles, 4,040,366, Cl. 112-121.290.
Bloom, Stanley M., to Polaroid Corporation. Pyrazolidone type developing agents. 4,040,832, Cl. 96-29.00R.
Blount, Richard, to General Electric Company. Photoflash array with discharge path for electrostatic charges. 4,041,300, Cl. 240-1.300.
Blue, Sidney D. Convertible shirt collar. 4,040,125, Cl. 2-139.000.
Boah, John K., to General Electric Company. Heating apparatus for temperature gradient zone melting. 4,041,278, Cl. 219-411.000.
Board of Supervisors Louisiana State University Agricultural and Mechanical College: *See*—
Nelms, Leonard H.; Reiszner, Kenneth D.; and West, Philip W., 4,040,805, Cl. 55-158.000.
Boardman, Robert William. Fence post remover. 4,040,601, Cl. 254-133.00R.
Bodenseewerk, Geratetechnik GmbH: *See*—
Oppelt, Hans, 4,041,314, Cl. 250-352.000.
Boeing Company, The: *See*—
Pogson, John T.; and Streck, Donald A., 4,040,478, Cl. 165-105.000.
Boelens, Harmannus; Takken, Hendrik J.; and Traas, Petrus C., to Naarden International N.V. Preparation of 4-methoxybenzonitrile perfume compositions. 4,040,986, Cl. 252-522.000.
Boger, Manfred; Drabek, Joseph; and Pissiotas, Georg, to Ciba-Geigy Corporation. Method for the cultivation of plants employing N-alkyl-

N-phenylsulfenyl-N'-phenyl-formamidine derivatives. 4,040,811, Cl. 71-78.000.
Bohn, Hans, to Behringwerke Aktiengesellschaft. AP-glycoproteins and process for isolating them. 4,041,021, Cl. 260-112.00B.
Boleda, Alberto; and Tracey, Robert J., to GTE Automatic Electric Laboratories Incorporated. Analog-to-digital converter using common circuitry for sample-and-hold and integrating functions. 4,041,484, Cl. 340-347.0NT.
Bonacina, Remigio. Method of candying fruit and fruit rinds. 4,041,184, Cl. 426-321.000.
Bonazzi, Aldo. Method and a circular knitting machine for manufacturing stockings and like articles having a Jacquard pattern over ribbed knitwork made of plain and purl stitches. 4,040,273, Cl. 66-19.000.
Bond, James W., to United States of America, Navy. Signal processing devices using residue class arithmetic. 4,041,284, Cl. 235-150.500.
Boranian, Armen G.; and Timm, Walter C., to GAF Corporation. Stack of tiles which have a release layer on one major face and an adhesive layer on the opposed major face does not require disposable release interlayers. 4,041,200, Cl. 428-40.000.
Border, Robert O.; and Rudman, Ronald H., to United States of America, Army. Variable spring rate equilibrators. 4,040,332, Cl. 89-37.00F.
Borg-Warner Corporation: *See*—
Gritter, David James, 4,041,368, Cl. 322-47.000.
Ivey, John Saxon, 4,040,339, Cl. 92-129.000.
Tuzson, John J., 4,040,773, Cl. 417-424.000.
Bortak, John J.: *See*—
Argade, Shyam D.; Bortak, John J.; Collins, Stephen M.; and Weissman, Eugene Y., 4,040,935, Cl. 204-256.000.
Bosche, Earl E.; Havlik, Jay M.; and Kyle, James C., to Dow Chemical Company, The. Flume mixer. 4,040,256, Cl. 61-15.000.
Botvin, George B., to ACS Industries, Inc. Scouring pad or the like. 4,040,139, Cl. 15-209.00B.
Boundy, Geoffrey A., to Boundy, Glenys Irene. Pipe sealing apparatus. 4,040,450, Cl. 138-94.000.
Boundy, Glenys Irene: *See*—
Boundy, Geoffrey A., 4,040,450, Cl. 138-94.000.
Bourgery, Guy R.: *See*—
Fauran, Claude P.; Bourgery, Guy R.; Raynaud, Guy M.; and Gouret, Claude J., 4,041,030, Cl. 544-117.000.
Fauran, Claude P.; Bourgery, Guy R.; and Gouret, Claude J., 4,041,072, Cl. 260-558.00A.
Bovier, Edward M.: *See*—
Voigt, John E.; and Bovier, Edward M., 4,040,862, Cl. 127-70.000.
Bower, Allen M.: *See*—
Swain, Leonard W.; and Bower, Allen M., 4,040,455, Cl. 141-225.000.
Boyd, Keith A., to Eaton Corporation. Flexible drive for rotating a fan. 4,040,272, Cl. 64-26.000.
Boyle, James. Dispenser cover and indicator. 4,041,480, Cl. 340-280.000.
Bradford, Robert S., Jr.: *See*—
Ault, Earl R.; Stevens, Philip C.; Sipman, Robert H.; and Bradford, Robert S., Jr., 4,041,415, Cl. 331-94.5PE.
Bradley, Frank R.; and McCoy, Rawley D., to Bradley Telcom Corporation. Telephone line characteristic display. 4,041,254, Cl. 179-175.30R.
Bradley Telcom Corporation: *See*—
Bradley, Frank R.; and McCoy, Rawley D., 4,041,254, Cl. 179-175.30R.
Bramer, Henry C.; and Shapiro, Edward, to Pittsburgh Environmental and Energy Systems, Inc. Method for purification of exhaust gases. 4,041,128, Cl. 423-213.200.
Brandle, Karl: *See*—
Kyri, Hans; Brandle, Karl; Muller, Martin; and Heine, Heinrich, 4,040,850, Cl. 106-87.000.
Brann, Dale A. Flip handle. 4,040,695, Cl. 312-320.000.
Brassert, Walter L.: *See*—
Heitmann, Arnold M.; Brassert, Walter L.; and Chouinard, Donald N., 4,040,251, Cl. 60-39.360.
Brattain, William G. Puzzle. 4,040,630, Cl. 273-157.00R.
Braudeau, Pierre; and Maillet, Alfred Marie Aime, to Carel Fouche Languepin. Method for adjusting the eccentricity of a spark-erosion machining electrode endowed with a movement of circular translation and a device for the application of said method. 4,041,268, Cl. 219-69.00G.
Braun Aktiengesellschaft: *See*—
Niese, Karl; and Hundhausen, Eckhard, 4,040,457, Cl. 141-361.000.
Braun, George. Backscrubber. 4,040,132, Cl. 4-158.000.
Braunreiter, Carl J.: *See*—
Stroom, Paul D.; and Braunreiter, Carl J., 4,040,474, Cl. 165-9.000.
Brave, Dennis G.: *See*—
Brave, Ronald M.; Brave, Dennis G.; and Feldeman, Arnold S., 4,041,265, Cl. 200-159.00R.
Brave, Ronald M.; Brave, Dennis G.; and Feldeman, Arnold S. Electric switch. 4,041,265, Cl. 200-159.00R.
Breed, Arthur R. Fastener assembly. 4,040,326, Cl. 85-32.0CS.
Breedon Press Limited, The: *See*—
Jepson, Michael John; and Kilbourne, Bernard, 4,040,167, Cl. 29-564.400.
Bretone, Salvatore William. Building block and wall construction. 4,040,225, Cl. 52-585.000.
Brewing Patents Limited: *See*—
Wilson, Richard John Hugh, 4,041,180, Cl. 426-11.000.
Bridgestone Tire Company Limited: *See*—
Takada, Tsutomu; Kato, Shingo; Utsunomiya, Tadashi; and Inoue, Sakae, 4,041,207, Cl. 428-421.000.
Briles, Franklin S. Fastener driving gun. 4,040,164, Cl. 29-432.000.
Briley, Bruce Edwin, to Bell Telephone Laboratories, Incorporated. Method and apparatus for operation of carbon microphones at low average current levels. 4,041,247, Cl. 179-81.00R.
Brimm, Collen Kieth. Partial turn panel fastener. 4,040,151, Cl. 24-221.00K.
Bristol-Myers Company: *See*—
Howard, Alan N., 4,041,153, Cl. 424-131.000.
British Leyland UK Limited: *See*—
Begg, John Robert William, 4,040,640, Cl. 280-106.00R.
Burton, Peter Edward; Pasquire, Derek James; and Marshall, Peter Edward George, 4,041,272, Cl. 219-89.000.
Britz, Robert N. Fan wheel. 4,040,769, Cl. 416-213.00A.
Brock, Robert J.; and Meitner, Gary H., to Kimberly-Clark Corporation. Nonwoven thermoplastic fabric. 4,041,203, Cl. 428-157.000.
Broemer, Heinz; and Meinert, Norbert, to Ernst Leitz G.m.b.H. Optical fluorophosphate glass and process of making same. 4,040,846, Cl. 106-47.00Q.
Broersma, Frank R.: *See*—
Basila, Michael R.; and Broersma, Frank R., 4,040,982, Cl. 252-466.00J.
Brooks, Donald Leslie William, to Ronson Corporation. Hinged closure for a battery-operated cigarette lighter. 4,040,541, Cl. 220-339.000.
Brooks, Raymond: *See*—
Lewis, Terence John; Brooks, Raymond; and Selby, John, 4,040,336, Cl. 90-11.00R.
Brosh, Amnon; and Geiger, Dana F., to Kulite Semiconductor Products, Inc. Digital scale or weighing apparatus. 4,041,289, Cl. 235-151.330.
Brown, Boveri & Cie.: *See*—
Frossard, Emile; Schleuniger, Fritz; and Stadler, Bruno, 4,041,541, Cl. 361-27.000.
Brown, Cicero C., deceased; Brown, Joe Russell, executor; and Brown, Ramey Lee, executor. Check valve assembly. 4,040,441, Cl. 137-519.500.
Brown, Jack M.: *See*—
Zemanek, Zdenek S.; and Brown, Jack M., 4,041,426, Cl. 335-131.000.
Brown, Joe Russell, executor: *See*—
Brown, Cicero C., deceased; Brown, Joe Russell, executor; and Brown, Ramey Lee, executor, 4,040,441, Cl. 137-519.500.
Brown, Leon Richard, to AMP Incorporated. Wire cone assembly. 4,040,180, Cl. 29-753.000.
Brown, Ramey Lee, executor: *See*—
Brown, Cicero C., deceased; Brown, Joe Russell, executor; and Brown, Ramey Lee, executor, 4,040,441, Cl. 137-519.500.
Brown, Stanley M.: *See*—
Robbins, Daniel T., 4,040,197, Cl. 43-15.000.
Brown, William E.; Baughn, Charles O.; and Linkenheimer, Wayne H., to E. R. Squibb & Sons, Inc. Use of pleuromutilin for the treatment of swine dysentery. 4,041,175, Cl. 424-311.000.
Brumbaugh, Andrew L. Ski and ski pole carrier. 4,040,551, Cl. 224-45.00S.
Bruno, Gerald A.: *See*—
Morcos, Nabil A.; Bruno, Gerald A.; and Haney, Thomas A., 4,041,317, Cl. 250-432.0PD.
Brunswick Corporation: *See*—
Meininger, James R., 4,040,399, Cl. 123-65.00R.
Brush, Douglas J.; Vonder, David L.; and Wilkis, Anthony J., to GTE Automatic Electric Laboratories Incorporated. Miniature low profile relay. 4,041,425, Cl. 335-129.000.
Bryan, Robert E.: *See*—
Papsco, William G.; Cohn, Harry, Jr.; and Bryan, Robert E., 4,040,588, Cl. 248-245.000.
Bryant Grinder Corporation: *See*—
Walasewicz, Stanley John; Erickson, Virgil William; Harrison, Robert Adams; and Houghton, Royal Elwin, 4,040,409, Cl. 125-11.0AS.
Buck, Carl J., to Johnson & Johnson. Modified cyanoacrylate monomers and methods of preparation. 4,041,061, Cl. 260-464.000.
Buck, Carl J., to Johnson & Johnson. Modified cyanoacrylate monomers and methods of preparation. 4,041,062, Cl. 260-465.00D.
Buck, Carl J., to Johnson & Johnson. Modified cyanoacrylate monomers and methods of preparation. 4,041,063, Cl. 260-465.400.
Budich, Wolfgang, to Dynamit Nobel Aktiengesellschaft. Profile arrangement for window frames or doorframes. 4,040,219, Cl. 52-209.000.
Buisson, Gaston; and Hennebert, Jacques, to Gerin, Merlin. Air-break circuit interrupter having magnetically-assisted arc-dividing electrodes. 4,041,356, Cl. 361-14.000.
Bungay, Henry R., III: *See*—
Trivedi, Ramesh C.; Bungay, Henry R., III; and Cuccolo, Paul J., 4,040,786, Cl. 23-230.00R.
Bunker Ramo Corporation: *See*—
Koegel, Ralph A., 4,040,276, Cl. 66-107.000.
Burk, George A.: *See*—
Goralski, Christian T.; Pews, R. Garth; and Burk, George A., 4,041,073, Cl. 260-556.0AR.
Burlington Industries, Inc.: *See*—
Crawford, William B.; and Solomon, Anthony T., 4,040,367, Cl. 112-273.000.
Imboden, Walter H., 4,040,128, Cl. 2-409.000.
Burroughs, Elvin O. Cable attachment. 4,040,754, Cl. 403-16.000.

Burroughs Wellcome Co.: *See*—
Grivsky, Eugene M., 4,041,071, Cl. 260-558.00R.
Burrows, Ian Edward; Cheney, Peter Arthur; and Ariss, Stephen Arthur, to Pedigree Petfoods Limited. Pet food and method of making same. 4,041,181, Cl. 426-55.000.
Burrus, Charles Andrew, Jr.; and Stone, Julian, to Bell Telephone Laboratories, Incorporated. Neodymium oxide doped yttrium aluminum garnet optical fiber. 4,040,890, Cl. 156-605.000.
Bursey, Maurice M.; Hinton, Deborah M.; Sammons, Martin C.; and Wightman, R. Mark, to Du Pont de Nemours, E. I., and Company. Electrochemical generation of field desorption emitters. 4,041,346, Cl. 313-336.000.
Burton, Dale Leroy: *See*—
Thomas, Paul Dana; and Burton, Dale Leroy, 4,041,386, Cl. 324-77.00R.
Burton, Peter Edward; Pasquire, Derek James; and Marshall, Peter Edward George, to British Leyland UK Limited. Resistance welding apparatus affording operator protection. 4,041,272, Cl. 219-89.000.
Burysek, Frantisek; Mikulecky, Karel; and Janousek, Jan, to Vyzkumny ustav bavlnarsky. Method of and apparatus for transporting empty bobbin tubes to a pick-up and delivery station in open-end spinning, winding, yarn texturing and similar machines. 4,040,573, Cl. 242-35.50A.
Bush Manufacturing Company: *See*—
Bush, Thomas P., Jr.; and Grant, Samuel Edward, 4,040,459, Cl. 144-312.000.
Bush, Thomas P., Jr.; and Grant, Samuel Edward, to Bush Manufacturing Company. Log handling system. 4,040,459, Cl. 144-312.000.
Butler, DeForest D.; and Mancik, Andy, to Square D Company. Oil-tight lay-in duct. 4,040,449, Cl. 138-92.000.
Butler, DeForest D.: *See*—
Jorgensen, George N.; King, Frank D.; and Butler, DeForest D., 4,040,755, Cl. 403-205.000.
Butler, Larry G.: *See*—
Kelly, Susan J.; and Butler, Larry G., 4,041,111, Cl. 260-954.000.
Buza, Thomas Brian: *See*—
Zipperian, Donald Edwin; Jones, James Allen; and Buza, Thomas Brian, 4,040,950, Cl. 209-166.000.
Cadec Systems, Inc.: *See*—
Reed, Roger R., 4,041,393, Cl. 325-54.000.
Cadic, Raymond, to Societe D'Exploitation Des Procedes Felix Amiot S.E.P.F.A. Device for tensioning a chain. 4,040,305, Cl. 74-242.15R.
Caldarelli, Antonio. Fluid energy system. 4,040,772, Cl. 417-364.000.
Caldwell, Dave L. Means and method of irrigation control. 4,040,436, Cl. 137-1.000.
Calgon Corporation: *See*—
Persinski, Leonard J.; Martin, Fred David; and Adams, Sally Lee, 4,040,854, Cl. 106-90.000.
Sharpe, Andrew Jackson, Jr.; Windhager, Robert H.; and Hearp, Kathleen Seese, 4,040,984, Cl. 252-500.000.
Callen Manufacturing Corporation: *See*—
Zucker, Armand S., 4,040,204, Cl. 46-2.000.
Cama, Lovji D.: *See*—
Firestone, Raymond A.; Cama, Lovji D.; and Christensen, Burton G., 4,041,029, Cl. 544-25.000.
Cambridge, Ronan Malcolm; and Watson, Douglas John, to Northern Telecom Limited. Switching circuit for telecommunications lines. 4,041,255, Cl. 179-175.30R.
Campbell, Bonnie J.; and Rieger, Klaus R., to UOP Inc. Finned tubing having enhanced nucleate boiling surface. 4,040,479, Cl. 165-133.000.
Campbell, George W., Jr.; Wilkins, David G.; and Muench, Jerome T., to United States Borax & Chemical Corporation. Fluid bed dehydration of borax. 4,041,132, Cl. 423-279.000.
Canadian Patents and Development Limited: *See*—
Richardson, Martin C.; and Leopold, Kurt, 4,041,414, Cl. 331-94.50G.
Candor, James T.; and Tassone, Joseph V. Method of making a package construction for baseball type playing components. 4,040,229, Cl. 53-29.000.
Canon Kabushiki Kaisha: *See*—
Ichiyanagi, Toshikazu, 4,041,362, Cl. 318-318.000.
Masaki, Katsumi; Hirayama, Kazuhiro; Sato, Yasushi; and Hirabayashi, Yoichi, 4,040,737, Cl. 355-49.000.
Tsuneda, Terukuni, 4,040,970, Cl. 252-62.10L.
Canron Limited: *See*—
Payne, Frederick George, 4,040,158, Cl. 29-123.000.
Capaul, Raymond W. Unitary structural panel for ceiling and wall installations. 4,040,213, Cl. 52-145.000.
Cappello, Anthony S. Safety match packet. 4,040,516, Cl. 206-109.000.
Capps, John B.: *See*—
Trost, Wayne C.; and Capps, John B., 4,040,451, Cl. 139-48.000.
Cardena, Pedro Garcia. Orthodontic elastic inserter tool and method. 4,040,187, Cl. 32-66.000.
Carel Fouche Languepin: *See*—
Braudeau, Pierre; and Maillet, Alfred Marie Aime, 4,041,268, Cl. 219-69.00G.
Carl Still, Firma: *See*—
Knappstein, Johannes; and Stratmann, Josef, 4,040,910, Cl. 202-262.000.
Carle, Ross G.; and Reinhardt, James R., to ACF Industries, Incorporated. Railway car cushioning device. 4,040,523, Cl. 213-46.00R.
Carlo-Erba S.p.A.: *See*—
Gandolfi, Carmelo; Doria, Gianfederico; Pellegata, Renato; and Usardi, Maria M., 4,041,064, Cl. 560-121.000.
Carlson, Gordon A.: *See*—
Hoekje, Howard H.; Carlson, Gordon A.; and Simmons, Robert B., 4,040,934, Cl. 204-256.000.
Carlson, Robert G., to General Electric Company. Transition reinforcement of composite blade dovetails. 4,040,770, Cl. 416-230.000.
Carmeci, Peter: *See*—
Ito, Yoichiro; and Carmeci, Peter, 4,040,742, Cl. 356-39.000.
Carpenter, James F.: *See*—
Wiggins, Edwin W.; and Carpenter, James F., 4,040,991, Cl. 260-2.5BD.
Carr, George Phillip: *See*—
Hamaker, Ralph A.; and Carr, George Phillip, 4,040,827, Cl. 96-1.0LY.
Carrier Corporation: *See*—
Steddom, Clark M.; and Yungblut, Charles W., 4,041,439, Cl. 338-78.000.
Carroll, Felix P.: *See*—
Bechara, Ibrahim S.; Carroll, Felix P.; Holland, Dewey G.; and Mascioli, Rocco L., 4,040,992, Cl. 260-2.5AW.
Carson, William S. Nestable fruit harvesting container. 4,040,461, Cl. 150-51.000.
Carter, Jesse Donald. Storage and carrying case for compact cassettes. 4,040,518, Cl. 206-387.000.
Carter, Reid F., to Chevron Research Company. Combination flyer-jumper and method of manufacture of same in which the jumper/-flyer is associated with a geophysical data acquisition system that provides digital data in the field before recording. 4,041,444, Cl. 340-15.5TS.
Carter, Reid F., to Chevron Research Company. Method of connecting flexible numbers of geophone flyer groups to data acquisition units. 4,041,445, Cl. 340-15.5TS.
Carter-Wallace, Inc.: *See*—
Soldati, Gianluigi, 4,041,028, Cl. 544-12.000.
Cartner, Donald W.: *See*—
Hopkins, Evan Leon; and Cartner, Donald W., 4,040,140, Cl. 15-236.00R.
Cartwright, John Edward, to Foseco International Limited. Refractory heat-insulating materials. 4,041,199, Cl. 428-36.000.
Casard Industries, Inc.: *See*—
Ward, Gregory A.; and Casey, Lawrence P., III, 4,040,562, Cl. 229-54.00R.
Casey, Lawrence P., III: *See*—
Ward, Gregory A.; and Casey, Lawrence P., III, 4,040,562, Cl. 229-54.00R.
Cassier, Robert X. Coin roll opener. 4,040,183, Cl. 30-296.00R.
Castello, Leo J. Knit-in pocket and method. 4,040,275, Cl. 66-64.000.
Catalyst Research Corporation: *See*—
Collins, William H., 4,041,217, Cl. 429-112.000.
Catanese, Carmen Anthony; and Keneman, Scott Allen, to RCA Corporation. Electron multiplier with beam confinement structure. 4,041,342, Cl. 313-105.00R.
Caterpillar Tractor Co.: *See*—
Nieman, John R., 4,040,468, Cl. 164-55.000.
Cavalleri, Bruno: *See*—
Assandri, Alessandro; Lancini, Giancarlo; Volpe, Giancarlo; and Cavalleri, Bruno, 4,041,168, Cl. 424-273.000.
CBS Inc.: *See*—
Lover, Seth E., 4,040,321, Cl. 84-1.150.
Cecil, Leonard. Golf glove. 4,040,126, Cl. 2-161.00A.
Centre Electronique Horloger S.A.: *See*—
Oguey, Henri J.; and Gerber, Bernard, 4,041,522, Cl. 357-42.000.
Cerro Corporation: *See*—
Eggers, Frank W., III; Wigger, Ralph O.; and Coan, Richard L., 4,040,865, Cl. 134-7.000.
Cgee Aisthom SA.: *See*—
Debaigt, Jean, 4,040,715, Cl. 339-272.00A.
Chabanel, Pierre, to Thomson-CSF. Automatic distortion correction arrangement. 4,041,534, Cl. 358-186.000.
Chaffin, John H., III; and Skogman, Richard A., to Honeywell Inc. Cadmium tellurite thin films. 4,040,927, Cl. 204-192.00S.
Champion Spark Plug Company: *See*—
Nemeth, Joseph, 4,040,998, Cl. 260-29.20M.
Chan, Kwok Yan; and Ko, Norman Wah Man, to W. Haking Industries, Ltd. Camera for underwater and above water use. 4,041,507, Cl. 354-64.000.
Chandler, John Leslie, to Alcan Research and Development Limited. Control of flocculant addition in sedimentation apparatus. 4,040,954, Cl. 210-42.00R.
Chaney, Preston E.; and Morgan, George W., to Suntech, Inc. Ice anchor. 4,040,262, Cl. 61-86.000.
Chang, Kenneth; and Pittler, Marvin S., to International Business Machines Corporation. Etching process utilizing the same positive photoresist layer for two etching steps. 4,040,891, Cl. 156-651.000.
Chang, Kern Ko Nan, to RCA Corporation. Avalanche transistor operating above breakdown. 4,041,515, Cl. 357-13.000.
Chang, Mike F.; Cline, Harvey E.; and Anthony, Thomas R., to General Electric Company. Semiconductor device manufacture. 4,040,868, Cl. 148-1.500.
Chany, Charles; Galliot, Brigitte; Chevalier, Marie-Josephe; and Ankel, Helmut. Pharmaceutical formulation of interferon insolubilized by fixation on a support. 4,041,152, Cl. 424-85.000.
Chapman, William L.: *See*—
Miller, Dale E.; Chapman, William L.; Dunster, Donald E.; and Thomas, Bobby J., 4,041,372, Cl. 324-9.000.

Charter, Ted R.: *See—*
Cota, Dan E.; Charter, Ted R.; Beeson, Robert M.; and Kinkead, Robin D., 4,041,467, Cl. 364-900.000.
Chase-Shawmut Company, The: *See—*
Kozacka, Frederick J., 4,041,525, Cl. 337-295.000.
Cheadle, George D.: *See—*
Kelley, Arnold E.; Reeg, Cloyd P.; Wood, Frederick C.; and Cheadle, George D., 4,040,944, Cl. 208-89.000.
Chemetal Corporation: *See—*
Holzl, Robert A., 4,040,870, Cl. 148-6.300.
Chemetron Corporation: *See—*
Moore, Donald G., 4,041,266, Cl. 219-10.55E.
Oppenheim, Carl Emil; and McKenna, James, 4,040,362, Cl. 105-226.000.
Chemie Linz Aktiengesellschaft: *See—*
Binder, Walter; Hutter, Josef; Stich, Heinrich; Ruckensteiner, Kurt; Tines, Josef, deceased; Tines, Antonie, legal representative; and Schwarz, Heide, legal representative, 4,040,853, Cl. 106-103.000.
Chemplex Company: *See—*
Hoff, Raymond E.; Pullukat, Thomas J.; and Shida, Mitsuzo, 4,041,224, Cl. 526-96.000.
Pullukat, Thomas J., 4,041,225, Cl. 526-96.000.
Cheney, Peter Arthur: *See—*
Burrows, Ian Edward; Cheney, Peter Arthur; and Ariss, Stephen Arthur, 4,041,181, Cl. 426-55.000.
Cherney, Steven D.: *See—*
Benson, Richard W.; Cherney, Steven D.; and Collier, Everett J., 4,040,988, Cl. 252-532.000.
Cheron, Jacques, to Institut Francais du Petrole, des Carburants et Lubrifiants. Device for the sealing of a block formed of a pile of plates, such as a block of a fuel cell, while maintaining free passageways between these plates. 4,040,598, Cl. 249-176.000.
Chetelat, Fernand, to Ebauches S.A. Electronic watch. 4,040,245, Cl. 58-4.00A.
Chevalier, Marie-Josephe: *See—*
Chany, Charles; Galliot, Brigitte; Chevalier, Marie-Josephe; and Ankel, Helmut, 4,041,152, Cl. 424-85.000.
Chevron Research Company: *See—*
Carter, Reid F., 4,041,444, Cl. 340-15.5TS.
Carter, Reid F., 4,041,445, Cl. 340-15.5TS.
Platt, James L.; and Schinski, William L., 4,041,159, Cl. 424-228.000.
Chiapparoli, Richard Samuel, Jr., to Bell Telephone Laboratories, Incorporated. Divide-by-N/2 frequency division arrangement. 4,041,403, Cl. 328-39.000.
Chiarelli, Carl. Pollution-free heating system. 4,040,566, Cl. 237-1.00A.
Children's Hospital Medical Center: *See—*
Clark, Leland C., Jr., 4,040,908, Cl. 195-103.50R.
Chireau, Roland F.: *See—*
Berchielli, Aldo S.; and Chireau, Roland F., 4,041,221, Cl. 429-206.000.
Chivari, Ilie. Coupling adapted to connect radially offset shafts. 4,040,270, Cl. 64-19.000.
Chlipalski, Adam. Apparatus for handling liquid filled flexible pouches. 4,040,235, Cl. 53-59.00R.
Chloride Group Limited: *See—*
Hewitt, Albert Thomas, 4,041,212, Cl. 429-89.000.
Chouinard, Donald N.: *See—*
Heitmann, Arnold M.; Brassert, Walter L.; and Chouinard, Donald N., 4,040,251, Cl. 60-39.360.
Christensen, Burton G.: *See—*
Firestone, Raymond A.; Cama, Lovji D.; and Christensen, Burton G., 4,041,029, Cl. 544-25.000.
Christensen, Fredrich M. Seat back tilt control unit. 4,040,663, Cl. 297-361.000.
Christenson, James Gordon; Gurien, Harvey; and Teitel, Sidney, to Hoffmann-La Roche Inc. Ecgonine derivative. 4,041,040, Cl. 260-292.000.
Christenson, James Gordon: *See—*
Avenia, Richard William; Christenson, James Gordon; and Pechenerer, Benjamin, 4,041,076, Cl. 260-559.00A.
Christian, Robert Francis, to Jude Engineering Incorporated. Mixing, conveying heating and/or cooling apparatus. 4,040,768, Cl. 416-122.000.
Christiana Industries Corporation: *See—*
Ferris, Robert C., 4,040,176, Cl. 29-624.000.
Christiansen, Jorn Uffe. Control unit for thermal conditioning systems. 4,040,565, Cl. 236-91.00G.
Christman, William J., to UOP Inc. Mercaptan extraction process utilizing a stripped alkaline solution. 4,040,947, Cl. 208-235.000.
Christopoulos, John, to Singer Company, The. Knit, tuck and welt cams for circular knitting machines. 4,040,274, Cl. 66-57.000.
Chrysler Corporation: *See—*
Davidson, Dennis D., 4,040,955, Cl. 210-44.000.
Churchill, Steven T., to Letot, Incorporated. Telephone signalling system having interruption preventive means. 4,041,242, Cl. 179-2.00A.
Chusha, Hideo, to Futaba Denshi Kogyo K. K. Reed switching opening and closing device. 4,041,427, Cl. 335-205.000.
Ciba-Geigy AG: *See—*
Loew, Peter; Defago, Raymond; and Koller, Stefan, 4,040,779, Cl. 8-2.50R.
Steiger, Rolf; Reber, Jean-Francois; Ezekiel, Aaron David; and Ficken, Geoffrey Ernest, 4,040,825, Cl. 96-1.700.
Ciba-Geigy Corporation: *See—*
Boger, Manfred; Drabek, Joseph; and Pissiotas, Georg, 4,040,811, Cl. 71-78.000.
Kocsis, Karoly; Peter, Heinrich; and Bickel, Hans, 4,041,161, Cl. 424-246.000.
Neher, Robert; and Kahnt, Friedrich Werner, 4,041,022, Cl. 260-112.50T.
Schwander, Hansrudolf; and Karlen, Urs, 4,041,052, Cl. 260-380.000.
Vlattas, Isidoros, 4,041,047, Cl. 260-332.100.
White, Howard L., 4,041,044, Cl. 260-308.00B.
Cibie Projecteurs: *See—*
Ricard, Jacques, 4,041,303, Cl. 240-41.40R.
Cinque, Alphonse P.; and Cinque, Mark G. Projection screen for optical images. 4,040,717, Cl. 350-127.000.
Cinque, Mark G.: *See—*
Cinque, Alphonse P.; and Cinque, Mark G., 4,040,717, Cl. 350-127.000.
Cities Service Company: *See—*
Greene, Marvin, 4,040,976, Cl. 252-373.000.
Wronka, John A., 4,041,102, Cl. 260-683.620.
Citizen Watch Company Limited: *See—*
Nishimura, Hajime; and Nomura, Yasushi, 4,041,219, Cl. 429-144.000.
Civic & Civic PTY Limited: *See—*
Cull, Alan Sidney, 4,040,222, Cl. 52-365.000.
Clark, Charles Albert, Jr., to RCA Corporation. High voltage protection circuit. 4,041,357, Cl. 361-6.000.
Clark, Joseph H.; and Grove, Leslie W., Jr. Method and arrangement for air testing of sewer lateral connections. 4,040,289, Cl. 73-46.000.
Clark, Kendall: *See—*
Belleson, James Garman; and Clark, Kendall, 4,040,745, Cl. 356-167.000.
Belleson, James Garman; and Clark, Kendall, 4,040,748, Cl. 356-199.000.
Clark, Leland C., Jr., to Children's Hospital Medical Center. Polarographic analysis of cholesterol and other macromolecular substances. 4,040,908, Cl. 195-103.50R.
Clarkson, Stanley G.; and Muscarella, Joseph N., deceased (by Muscarella, Ida M., administratrix), to Xerox Corporation. Sheet turn around/inverter. 4,040,616, Cl. 271-65.000.
Clausen, Carl F.: *See—*
Eide, Ove; and Clausen, Carl F., 4,040,263, Cl. 61-86.000.
Clausen, Ib Christian: *See—*
Arfelt, Soren Christian Schoubye; Clausen, Ib Christian; Jensen, Johannes; Fynbo, Knud Hansen; and Fischer, Jean Arnold, 4,040,652, Cl. 292-167.000.
Claypool, James P.; and Hoogenraad, Gerrit, to Delich, Donald C., a part interest. Page turner apparatus. 4,040,195, Cl. 40-341.000.
Clayton, Hadwen A.: *See—*
Zahn, Carl W.; and Clayton, Hadwen A., 4,040,259, Cl. 62-37.000.
Clegg, Gordon A.; Cull, Geoffrey Maurice; Fisher, Phillip Andrew; and Unsworth, William, to Magnesium Elektron Limited. Addition of magnesium to molten metal. 4,040,818, Cl. 75-58.000.
Cleland, Lorraine M.: *See—*
Yamaguchi, Takeshi, 4,040,823, Cl. 75-203.000.
Clenet, Alain Jean-Marie. Bug deflector. 4,040,656, Cl. 296-91.000.
Clifford, Earl W., to Aro Corporation, The. Control valves for tracheotomy patient or laryngeal prosthesis. 4,040,428, Cl. 128-351.000.
Clifford, Leonard W.: *See—*
Baillargeon, John L.; and Clifford, Leonard W., 4,040,406, Cl. 123-146.50A.
Clifford, Roy: *See—*
Giffen, William McAlpin; Pollitt, John Michael; and Clifford, Roy, 4,040,645, Cl. 280-745.000.
Cline, Harvey E.; and Anthony, Thomas R., to General Electric Company. Deep diode zeners. 4,040,171, Cl. 29-577.000.
Cline, Harvey E.: *See—*
Anthony, Thomas R.; and Cline, Harvey E., 4,040,869, Cl. 148-1.500.
Chang, Mike F.; Cline, Harvey E.; and Anthony, Thomas R., 4,040,868, Cl. 148-1.500.
Cloup, Jean. Apparatus for erecting a mast. 4,040,217, Cl. 52-115.000.
Cloup, Jean. Punching machines. 4,040,320, Cl. 83-527.000.
Clovis, James S.; Dohling, Jerome; and Nicastro, Francis J., to Rohm and Haas Company. Recovery of methacrylic acid from the effluent obtained from the condensation of formaldehyde and propionic acid. 4,040,913, Cl. 203-69.000.
Clovis, James S.; and Sullivan, Francis R., to Rohm and Haas Company. Thermally stable polyphosphonates as flame retardants. 4,041,107, Cl. 260-876.00R.
Clupak, Inc.: *See—*
Emerson, James Wade, 4,040,899, Cl. 162-13.000.
Coal Industry (Patents) Limited: *See—*
Martin, David James Reginald, 4,041,495, Cl. 343-112.00R.
Coaltek Associates: *See—*
Davis, Rufus F., Jr.; and Marting, Donald G., 4,040,961, Cl. 210-195.00R.
Coan, Richard L.: *See—*
Eggers, Frank W., III; Wigger, Ralph O.; and Coan, Richard L., 4,040,865, Cl. 134-7.000.
Coats & Clark, Inc.: *See—*
Einhorn, Ruediger, 4,040,149, Cl. 248-493.000.
Cockram, Geoffrey Norman: *See—*
Towersey, Peter John; Longton, John; and Cockram, Geoffrey Norman, 4,041,189, Cl. 426-656.000.

Cognitronics Corporation: *See—*
Shepard, David H.; and Gushue, Edward J., 4,041,454, Cl. 340-146.30F.
Cohen, Noal; and Saucy, Gabriel, to Hoffmann-La Roche Inc. Synthesis of 2,6,10-trimethyl-undecan-1-ol. 4,041,058, Cl. 260-410.90R.
Cohn, Harry, Jr.: *See—*
Papsco, William G.; Cohn, Harry, Jr.; and Bryan, Robert E., 4,040,588, Cl. 248-245.000.
Cole, Kenneth Raymond. Apparatus for retaining and readily releasing a shaker screen. 4,040,951, Cl. 209-408.000.
Coleman Company Inc., The: *See—*
Hill, Max Lee; and Kimmel, Richard James, 4,040,654, Cl. 296-57.00R.
Colgate-Palmolive Company: *See—*
Compa, Russell Edward; Liebowitz, Marvin; and Messina, Ralph Paul, 4,041,205, Cl. 428-220.000.
Douglass, Miriam L., 4,041,033, Cl. 260-250.00A.
Fischer, Charles F., 4,041,119, Cl. 264-75.000.
Gaffar, Maria Corazon; Gaffar, Abdul; and Hauschild, John P., 4,041,149, Cl. 424-57.000.
Renaud, Jean; and Narcy, Jean-Paul, 4,040,989, Cl. 252-548.000.
Collier, Everett J.: *See—*
Benson, Richard W.; Cherney, Steven D.; and Collier, Everett J., 4,040,988, Cl. 252-532.000.
Collin, Lars Th., to Lars Collin Consult AB. Method of and an apparatus for analysis of the exhaust gases from internal combustion engines. 4,040,783, Cl. 23-232 R.
Collins, D. Stephen: *See—*
Villaume, Henry F.; Collins, D. Stephen; and Peoples, Patrick J., 4,040,743, Cl. 356-73.000.
Collins, Edward J.; and Medved, Donald C., to General Electric Company. Flash lamp array having shorting lamps. 4,040,777, Cl. 431-95.00A.
Collins, Robert F., to Kendall Company, The. Surgical drape with retaining means. 4,040,418, Cl. 128-132.00D.
Collins, Stephen M.: *See—*
Argade, Shyam D.; Bortak, John J.; Collins, Stephen M.; and Weissman, Eugene Y., 4,040,935, Cl. 204-256.000.
Collins, William H., to Catalyst Research Corporation. Thermal battery with metal-metal oxide heating composition. 4,041,217, Cl. 429-112.000.
Coltrinari, Enzo: *See—*
Baltz, John; and Coltrinari, Enzo, 4,041,126, Cl. 423-22.000.
Comex Marine Services, Inc.: *See—*
Shotbolt, Keith, 4,040,650, Cl. 285-18.000.
Commissariat a l'Energie Atomique: *See—*
Dumont, Pierre; and Moise, Alain, 4,041,236, Cl. 13-25.000.
Dussaussoy, Pierre, 4,041,195, Cl. 264-60.000.
Compa, Russell Edward; Liebowitz, Marvin; and Messina, Ralph Paul, to Colgate-Palmolive Company. Residue-free fabric softening article for use in laundry dryer. 4,041,205, Cl. 428-220.000.
Compaan, Klaas: *See—*
Kramer, Pieter; Compaan, Klaas; and Forsthuber, Robert Franz Karl, 4,041,530, Cl. 358-128.000.
Compagnie Generale d'Electricite S.A.: *See—*
Desplanches, Gerard; Lazennec, Yvon; and Wicker, Alain, 4,041,216, Cl. 429-104.000.
Compagnie Industrielle des Telecommunications Cit-Alcatel SA.: *See—*
Gauriat, Gilles; Vernezy, Jacques; and Barigot, Jean-Claude, 4,041,392, Cl. 325-38.00A.
Compagnie Internationale pour l'Informatique: *See—*
Fressineau, Jean-Louis; and Hubert, Maurice, 4,041,290, Cl. 235-156.000.
Component Manufacturing Service, Inc.: *See—*
Ramsay, Donald C.; and Tantillo, James M., 4,040,697, Cl. 339-61.00R.
Composite Structures Corporation: *See—*
Fetherston, William H.; and Theriault, Maurice N., 4,040,137, Cl. 9-310.0AA.
Compton, Wayne W.; and Draper, Robert Paul, to Kim Lighting, Inc. Luminaire and reflector therefor. 4,041,306, Cl. 240-103.00R.
Conerly, Howard Jeffery, to International Telephone and Telegraph Corporation. Scanner-distributor apparatus for matrix system. 4,041,465, Cl. 364-900.000.
Conners, John P.: *See—*
Kolell, Norbert C.; and Conners, John P., 4,041,287, Cl. 235-151.110.
Consonni, Pietro: *See—*
Pifferi, Giorgio; Omodei-Sale', Amedeo; and Consonni, Pietro, 4,041,048, Cl. 260-333.000.
Consupak, Inc.: *See—*
Farrell, John Jerome, 4,040,203, Cl. 432-124.000.
Continental Carbon Company: *See—*
Norman, Don T., 4,040,792, Cl. 23-259.500.
Continental Group, Inc., The: *See—*
Ostrem, Obert M.; Kulikowski, Donald F.; and Pulciani, Sam C., 4,040,540, Cl. 220-273.000.
Continental Oil Company: *See—*
Miller, Dale E.; Chapman, William L.; Dunster, Donald E.; and Thomas, Bobby J., 4,041,372, Cl. 324-9.000.
Control Data Corporation: *See—*
Norberg, Gayle Russell, 4,041,455, Cl. 340-146.10C.
Conway, Arch W.; and Urdaneta, Nelson, to Dana Laboratories, Inc. Voltage level display circuit. 4,041,288, Cl. 235-151.310.
Cook, Harold L., Jr.; Geer, Ernest C.; and Katz, Donald L., to Transco Energy Company. Method for increasing the recovery of natural gas from a geo-pressured aquifer. 4,040,487, Cl. 166-314.000.
Cooksey, James Judson: *See—*
Weiss, William Robert; Saich, Anthony Michael; and Cooksey, James Judson, 4,040,782, Cl. 28-271.000.
Cooper, John LaMonte; and Newnam, James Alvis, to Du Pont de Nemours, E. I., and Company. Polysiloxane coated polyester fibers blended with other fibers to obtain fibrous mass having more acceptable flame resistance than a mass of unblended polysiloxane coated fibers. 4,040,371, Cl. 112-420.000.
Coppola, Patrick S.; and Kotansky, Stephen, to General Electric Company. Shut-off valve. 4,040,600, Cl. 251-63.000.
Cornell, Edward P., to General Electric Company. Constant torque induction motor drive system. 4,041,361, Cl. 318-227.000.
Cornils, Boy: *See—*
Bexten, Ludger; Noeske, Heinz; Tummes, Hans; and Cornils, Boy, 4,041,081, Cl. 260-601.00R.
Gothel, Herbert; Cornils, Boy; Feichtinger, Hans; Tummes, Hans; and Falbe, Jurgen, 4,041,080, Cl. 260-585.00B.
Corwin, John Roy: *See—*
Tappan, Harold B.; and Corwin, John Roy, 4,040,312, Cl. 74-801.000.
Cosby, Richard E.: *See—*
Vermes, Roy E.; and Cosby, Richard E., 4,040,618, Cl. 271-182.000.
Cosden Technology, Inc.: *See—*
Watson, James M., 4,040,912, Cl. 203-9.000.
Costa, Paul F.: *See—*
Silverman, Seymour; Costa, Paul F.; and Block, Charles, 4,040,366, Cl. 112-121.290.
Cota, Dan E.; Charter, Ted R.; Beeson, Robert M.; and Kinkead, Robin D., to Xerox Corporation. Transcriber system for the automatic generation and editing of text from shorthand machine outlines. 4,041,467, Cl. 364-900.000.
Cottier, Derek; and Rossell, John Barry, to Lever Brothers Company. Food composition. 4,041,188, Cl. 426-607.000.
Cotton, Donald J. Vertical liquid electrode employed in electrolytic cells. 4,040,932, Cl. 204-219.000.
Coulter Electronics, Inc.: *See—*
Gulliford, Henry Howard; and Dunstan, Harvey John, 4,041,385, Cl. 324-71.0CP.
Courty, Albert: *See—*
Desormiere, Bernard; Menager, Olivier; Courty, Albert; and Eumurian, Gregoire, 4,041,419, Cl. 333-30.00R.
Coussan, Sidney G., to Production Specialties, Inc. Arrangement for positioning a member in a receiving section of a side pocket mandrel. 4,040,481, Cl. 166-214.000.
Cowden, Earl Thomas, to North Electric Company. Transformerless two-wire/four-wire hybrid with DC sourcing capability. 4,041,252, Cl. 179-170.0NC.
CPC International Inc.: *See—*
Walon, Raoul G. P., 4,040,861, Cl. 127-46.00A.
Crawford, William B.; and Solomon, Anthony T., to Burlington Industries, Inc. Bobbin low detector. 4,040,367, Cl. 112-273.000.
Crest Industries, Inc.: *See—*
Rasmussen, Harry R., 4,040,699, Cl. 339-91.00R.
Creteau, Peter Verne: *See—*
Wisdom, Graham John; Creteau, Peter Verne; and Williams, John Lloyd, 4,041,460, Cl. 364-900.000.
Cross, Barrington; and Walworth, Bryant Leonidas, to American Cyanamid Company. 1,2-Dialkyl-3,4,5-trisubstituted pyrazole compounds. 4,041,046, Cl. 548-375.000.
Cross, Bryan C. Bale handling apparatus. 4,040,531, Cl. 214-77.00R.
Crown Zellerbach Corporation: *See—*
Litzinger, Paul C., 4,040,856, Cl. 106-170.000.
Cubic Corporation: *See—*
Watt, Richard Edwin, 4,041,490, Cl. 343-17.700.
Cubic-Western Data: *See—*
Adams, Ralph Delta; and Ingram, Charles Junior, 4,040,345, Cl. 101-66.000.
Cuccolo, Paul J.: *See—*
Trivedi, Ramesh C.; Bungay, Henry R., III; and Cuccolo, Paul J., 4,040,786, Cl. 23-230.00R.
Cull, Alan Sidney, to Civic & Civic PTY Limited. Cavity wall and method using adjustable spacing devices. 4,040,222, Cl. 52-365.000.
Cull, Geoffrey Maurice: *See—*
Clegg, Gordon A.; Cull, Geoffrey Maurice; Fisher, Phillip Andrew; and Unsworth, William, 4,040,818, Cl. 75-58.000.
Curti, Ezio. Adjustable work table for silk screen printer. 4,040,352, Cl. 101-407.0BP.
Curtiss-Wright Corporation: *See—*
Woodier, George H., 4,040,392, Cl. 123-8.450.
D. Swarovski & Co.: *See—*
Porcham, Wolfgang, 4,041,127, Cl. 423-92.000.
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Arfelt, Soren Christian Schoubye; Clausen, Ib Christian; Jensen, Johannes; Fynbo, Knud Hansen; and Fischer, Jean Arnold, 4,040,652, Cl. 292-167.000.
Dahle, Gerald, to Wilhelm Dahle Buro- und Zeichengeratefabrik. Hand-operated stapler. 4,040,556, Cl. 227-120.000.
Dahlstrom, Arvid, to Dahltron Corporation. Double-acting electrical receptacle. 4,040,712, Cl. 339-255.00R.
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Dahlstrom, Arvid, 4,040,712, Cl. 339-255.00R.
Dai Nippon Insatsu Kabushiki Kaisha: *See—*
Matsubara, Izuru, 4,040,716, Cl. 350-4.000.
Dai Nippon Tokyo Co., Ltd.: *See—*
Makishima, Hiroshi; Hosoda, Minoru; Kasiwagi, Eiichi; and Hayashi, Toshiharu, 4,040,842, Cl. 106-1.000.

Daicel Ltd.: *See—*
Nagatugi, Shuzo; Miyagawa, Akira; and Fukuoka, Suguru, 4,040,879, Cl. 149-18.000.

Daimler-Benz Aktiengesellschaft: *See—*
Zeilinger, Karl, 4,040,391, Cl. 123-8.090.

Dale, John Robert: *See—*
Hight, Michael John; Winkle, Roy Victor; and Dale, John Robert, 4,040,885, Cl. 156-378.000.

Dalichow, Rolf W.; and Woodhull, Frederic W., to Hewlett-Packard Company. Apparatus and method for measuring the frequency of a sweeping signal. 4,041,387, Cl. 324-78.00R.

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Voreck, Wallace E., Jr.; and Dalrymple, Everett W., 4,040,356, Cl. 102-28.00R.

Daly, John W.: *See—*
Darrow, Kenneth A.; Kydd, Paul H.; and Daly, John W., 4,040,159, Cl. 29-156.80H.

Damiano, Victor V.: *See—*
Baldi, Alfonso L.; and Damiano, Victor V., 4,041,196, Cl. 427-252.000.

Damsky, Arnold Marvin. Plug-in electrical receptacle extender. 4,040,710, Cl. 339-154.00A.

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Conway, Arch W.; and Urdaneta, Nelson, 4,041,288, Cl. 235-151.310.

Daniel, Leonard. Method for the formation of articles from collagenous material. 4,041,183, Cl. 426-105.000.

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Lundsgart, Henning Borge, 4,040,472, Cl. 164-154.000.

Darrow, Kenneth A.; Kydd, Paul H.; and Daly, John W., to General Electric Company. Method of manufacture of cooled airfoil-shaped bucket. 4,040,159, Cl. 29-156.80H.

Data Test Corporation: *See—*
Thomas, Paul Dana; and Burton, Dale Leroy, 4,041,386, Cl. 324-77.00R.

Dauby, Alain; Riso, Vladimir; and Roger-Rodes, Daniel, to International Business Machines Incorp. High-speed digital multiply-by-device. 4,041,296, Cl. 235-164.000.

David, Donald J.; and Willson, Michael C., to Monsanto Research Corporation. Waveguide holder-humidifier. 4,040,691, Cl. 312-31.000.

David, Donald J.; and Hardy, Edgar E., to Monsanto Research Corporation. Organic vapor detection with liquid crystals. 4,040,749, Cl. 356-201.000.

David, Melvin J. Collapsible luggage carrier. 4,040,642, Cl. 280-654.000.

Davidson, Dennis D., to Chrysler Corporation. Method of treating wastewater containing emulsified oils. 4,040,955, Cl. 210-44.000.

Davis, James L.; and Ewing, Keith E., to General Motors Corporation. Method of adjusting resistance of a thick-film thermistor. 4,041,440, Cl. 338-195.000.

Davis, Michael Ian; Mayes, Gary Wayne; McDermott, Thomas Stephen; and Wise, Larry Edward, to International Business Machines Corporation. Data processing system featuring subroutine linkage operations using hardware controlled stacks. 4,041,462, Cl. 364-200.000.

Davis, Peter Robert, to English Electric Valve Company Limited. Travelling wave tubes. 4,041,349, Cl. 315-3.500.

Davis, Richard Kent, to General Electric Company. Sawtooth waveform generator. 4,041,405, Cl. 328-181.000.

Davis, Rufus F., Jr.; and Marting, Donald G., to Coaltek Associates. Separation of solids from a liquid. 4,040,961, Cl. 210-195.00R.

Davison, Sol; and Gergen, William P., to Shell Oil Company. Blends of certain hydrogenated block copolymers. 4,041,103, Cl. 260-857.00D.

Day, Clive Richard: *See—*
Midwinter, John Edwin; and Day, Clive Richard, 4,040,807, Cl. 65-3.00A.

Deal, Samuel Broughton; and Bartch, Donald Walter, to RCA Corporation. Cathode-ray tube having conductive internal coating exhibiting reduced gas absorption. 4,041,347, Cl. 313-450.000.

Dean, John Richard, to International Telephone and Telegraph Corporation. Luminaire using one-way mirror as exterior lens. 4,041,305, Cl. 240-92.000.

Deaton, Carlton D.: *See—*
Stockdale, Douglas P.; Mencarini, Richard; Deaton, Carlton D.; and Owen, Ralph M., 4,040,234, Cl. 53-38.000.

Debaigt, Jean, to Cgee Alsthom SA. Screw terminal with a captive screw. 4,040,715, Cl. 339-272.00A.

De Boer, Wilhelmus Johannes; Schinkel, Willem; and Span, Francis Johannes, to U.S. Philips Corporation. Transport device for test sample carriers. 4,040,533, Cl. 214-310.000.

De Bresser, Gijsbert Frederik Maria; Kassenaar, Teunis Adrianus; Veraa, Ludovicus-Gerardus Johannes Godefrida; and Weenink, Leon Pieter, to U.S. Philips Corporation. Contact strip. 4,040,706, Cl. 339-103.00R.

Decca Limited of Decca House: *See—*
Plows, Graham Stuart; and Edge, Gordon Malcolm, 4,041,532, Cl. 358-128.000.

Decker, Gerd; Steinke, Dieter; and Reichel, Kurt, to Volkswagenwerk Aktiengesellschaft. Ignited internal combustion engine operated with charge stratification. 4,040,393, Cl. 123-30.00A.

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Kahle, Glenn W.; and Olsen, Sydney A., 4,040,249, Cl. 60-39.51H.

Deerkoski, Leonard F., to United States of America, National Aeronautics and Space Administration. Pseudo noise code and data transmission method and apparatus. 4,041,391, Cl. 325-30.000.

Defago, Raymond: *See—*
Loew, Peter; Defago, Raymond; and Koller, Stefan, 4,040,779, Cl. 8-2.50R.

DeFrees, Joseph H. Openable bottom loading adapter for transport tank. 4,040,456, Cl. 141-349.000.

de Haan, Andre Paul. Process for synthesizing organo-tin compounds. 4,041,060, Cl. 260-429.700.

Dehye Harvesters Limited: *See—*
Moore, George Edgar; and Morris, Alan Francis, 4,040,344, Cl. 100-95.000.

Deitz, Victor R.; and Blachly, Charles H. Activation of water soluble amines by halogens for trapping methyl radioactive iodine from air streams. 4,040,802, Cl. 55-71.000.

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Fauran, Claude P.; Bourgery, Guy R.; and Gouret, Claude J., 4,041,072, Cl. 260-558.00A.

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Fauran, Claude P.; Bourgery, Guy R.; Raynaud, Guy M.; and Gouret, Claude J., 4,041,030, Cl. 544-117.000.

Delich, Donald C.: *See—*
Claypool, James P.; and Hoogenraad, Gerrit, 4,040,195, Cl. 40-341.000.

Delle-Alsthom: *See—*
Deville, Robert, 4,041,545, Cl. 361-120.000.

Deltrol Corporation: *See—*
Harris, John L., 4,041,424, Cl. 335-75.000.

De Lucchi, Gerald B. Charcoal broiler. 4,040,343, Cl. 99-421.00H.

DEMAG Aktiengesellschaft: *See—*
Kullmann, Rolf; and Pfeil, Erhard, 4,040,609, Cl. 266-143.000.

DeMartino, Ronald: *See—*
Szymanski, Chester D.; and DeMartino, Ronald, 4,041,001, Cl. 260-29.6WA.

Demerson, Christopher A.; Humber, Leslie G.; Asselin, Andre A.; Jirkovsky, Ivo; and Dobson, Thomas A., to Ayerst McKenna and Harrison Ltd. Pharmaceutical method for using pyrano-and thiopyranoindole derivatives. 4,041,169, Cl. 424-274.000.

Demetrescu, Mihai C. Engine selectively utilizing hybrid thermodynamic combustion cycles. 4,040,395, Cl. 123-32.0EA.

Deming, Andrew F., to Alliance Manufacturing Company, Inc., The. Switch mechanism. 4,041,259, Cl. 200-46.000.

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van den Enden, Adrianus Wilhelmus Maria; Kuipers, Franciscus Antonius; de Niet, Edmond; and Druyvesteyn, Willem Frederik, 4,041,478, Cl. 340-174.0TF.

Dennis, Charles A.: *See—*
Kratz, Gary L.; Sproul, William W., III; Walendziewicz, Eugene T.; Wallis, Donald E.; and Dennis, Charles A., 4,041,461, Cl. 364-200.000.

de Nora, Vittorio: *See—*
Nidola, Antonio; Spaziante, Placido M.; and de Nora, Vittorio, 4,040,914, Cl. 204-12.000.

Deresh, Ilya Abramovich: *See—*
Shikhirev, Boris Nikolaevich; Matrosov, Evgeny Arkadievich; and Deresh, Ilya Abramovich, 4,040,209, Cl. 51-80.00A.

Deshmukh, Arvind D. Method for checking the accuracy of a test, using a serum-soluble cholesterol compound. 4,040,784, Cl. 23-230.00B.

Desormiere, Bernard; Menager, Olivier; Courty, Albert; and Eumurian, Gregoire, to Thomson-CSF. Surface elastic wave analogue correlator. 4,041,419, Cl. 333-30.00R.

DeSoto, Inc.: *See—*
Sekmakas, Kazys; and Gotschall, George E., 4,040,995, Cl. 260-22.0CQ.

Desowag-Bayer Holzschutz GmbH: *See—*
Metzner, Wolfgang; and Koddebusch, Hubert, 4,041,176, Cl. 424-318.000.

Desplanches, Gerard; Lazennec, Yvon; and Wicker, Alain, to Compagnie Generale d'Electricite S.A. Sodium-sulphur battery, more particularly for electrical drive. 4,041,216, Cl. 429-104.000.

Deutsche Gold- und Silber-Scheideanstalt vormals Roessler: *See—*
Roebke, Wolfgang; Kneitel, Dieter; and Parr, Erfried, 4,040,972, Cl. 252-179.000.

Deville, Robert, to Delle-Alsthom. Lightning conductor in a metallic casing. 4,041,545, Cl. 361-120.000.

Dhugues, Paul; and Zanca, Francois. Apparatus for treating exhaust gases of internal combustion engines. 4,040,253, Cl. 60-303.000.

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Hopkins, Roger A., 4,040,350, Cl. 101-376.000.

Diamond Shamrock Corporation: *See—*
Moser, Robert E.; Powers, Larry J.; and Ariyan, Zaven S., 4,041,167, Cl. 424-270.000.
Schenker, Barry A.; and Franks, C. Richard, 4,040,939, Cl. 204-290.00F.

Diamond Shamrock Technologies S.A.: *See—*
Nidola, Antonio; Spaziante, Placido M.; and de Nora, Vittorio, 4,040,914, Cl. 204-12.000.

Diamond, Sidney: *See—*
Bleiberg, Melvin L.; Diamond, Sidney; Rowcliffe, Arthur F.; and Spitznagel, John A., 4,040,876, Cl. 148-37.000.

Dickey, Ralph E. Apparatus for holding a microphone. 4,040,547, Cl. 224-5.00H.

Dickmeyer, Robert D.: *See*—
Wood, Gail E.; and Dickmeyer, Robert D., 4,040,309, Cl. 74-665.00T.
Dictaphone Corporation: *See*—
Matz, Bjorn J.; and Foster, Edward J., 4,041,249, Cl. 179-100.1DR.
Didderen, Freddy: *See*—
Ghosez, Leon; Rossey, Guy; and Didderen, Freddy, 4,041,077, Cl. 260-562.00R.
Diehl, Karl-Heinz: *See*—
Eggensperger, Heinz; and Diehl, Karl-Heinz, 4,040,977, Cl. 252-401.000.
Dierberger, James Albert; and White, Loren Hawdon, to United Technologies Corporation. Coolable nozzle guide vane. 4,040,767, Cl. 415-115.000.
Diesel Kiki Co., Ltd.: *See*—
Tomita, Hitoshi, 4,040,396, Cl. 123-32.0JV.
Dietrich, William J., to DMI, Inc. Automatic reset plow. 4,040,491, Cl. 172-269.000.
Digitron AG.: *See*—
Krieg, Walter, 4,040,527, Cl. 214-16.40A.
Dillon, James E., to UOP Inc. Oxygen sensor. 4,040,930, Cl. 204-195.00S.
Director-General of the Agency of Industrial Science and Technology: *See*—
Yamada, Yasuhiro; Honda, Hidemasa; and Kakiyama, Hitoo, 4,040,941, Cl. 208-8.000.
DMI, Inc.: *See*—
Dietrich, William J., 4,040,491, Cl. 172-269.000.
Dobson Park Industries Limited: *See*—
Thompson, Arthur David, 4,040,584, Cl. 248-2.000.
Dobson, Thomas A.: *See*—
Demerson, Christopher A.; Humber, Leslie G.; Asselin, Andre A.; Jirkovsky, Ivo; and Dobson, Thomas A., 4,041,169, Cl. 424-274.000.
Dohling, Jerome: *See*—
Clovis, James S.; Dohling, Jerome; and Nicastro, Francis J., 4,040,913, Cl. 203-69.000.
Dola, Frank Peter; and Rossler, Frederick William, Jr., to AMP Incorporated. Lighting unit assembly. 4,040,709, Cl. 339-125.00L.
Donahue, James T.; Hall, Kenneth M.; and Worth, Arthur J., to Sola Basic Industries, Inc. Meter module assembly for a meter panel. 4,041,358, Cl. 361-365.000.
Donegan, Edward Alfred, to TRW Canada Limited. Drill rod thread form. 4,040,756, Cl. 403-307.000.
Doorakian, George A.: *See*—
McGraw, Philip W.; Doorakian, George A.; and Rains, Randall C., 4,041,019, Cl. 260-75.0NC.
Dorazio, Alton E.: *See*—
Altenburger, Otto; and Dorazio, Alton E., 4,041,253, Cl. 179-175.20R.
Doria, Gianfederico: *See*—
Gandolfi, Carmelo; Doria, Gianfederico; Pellegata, Renato; and Usardi, Maria M., 4,041,064, Cl. 560-121.000.
Douglas, Robert Ritson, to Singer Company, The. Gas meter temperature compensating tangents. 4,040,296, Cl. 73-281.000.
Douglass, Miriam L., to Colgate-Palmolive Company. Novel derivatives of pyridazine-2-oxide. 4,041,033, Cl. 260-250.00A.
Dow Chemical Company, The: *See*—
Bosche, Earl E.; Havlik, Jay M.; and Kyle, James C., 4,040,256, Cl. 61-15.000.
Goralski, Christian T.; Pews, R. Garth; and Burk, George A., 4,041,073, Cl. 260-556.0AR.
Gross, James R., 4,041,020, Cl. 260-79.30M.
Gross, James R.; and McFadden, Russell T., 4,041,231, Cl. 526-317.000.
Gross, James Richard, 4,041,228, Cl. 526-240.000.
McGraw, Philip W.; Doorakian, George A.; and Rains, Randall C., 4,041,019, Cl. 260-75.0NC.
Nelson, Wayne F., 4,040,488, Cl. 166-317.000.
Nimerick, Kenneth H.; and Simpson, Benny E., 4,040,967, Cl. 252-8.55R.
Roy, Alejo V.; and Heiwig, Jane R., 4,040,787, Cl. 23-230.00B.
Strycker, Stanley J., 4,041,178, Cl. 424-329.000.
Downing, Alvin. Pontoon boat. 4,040,134, Cl. 9-2.00F.
Drabek, Joseph: *See*—
Boger, Manfred; Drabek, Joseph; and Pissiotas, Georg, 4,040,811, Cl. 71-78.000.
Drabik, Walter: *See*—
Madsen, John E.; and Drabik, Walter, 4,041,338, Cl. 310-186.000.
Draper, Robert Paul: *See*—
Compton, Wayne W.; and Draper, Robert Paul, 4,041,306, Cl. 240-103.00R.
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Dresser Industries, Inc.: *See*—
Blackwell, Henry Wayne, 4,040,649, Cl. 285-3.000.
Hopkinson, Eric C., 4,041,309, Cl. 250-262.000.
Keller, Wilbur S., 4,040,680, Cl. 308-8.200.
Saxman, William Craig, 4,040,493, Cl. 175-374.000.
Druyvesteyn, Willem Frederik: *See*—
van den Enden, Adrianus Wilhelmus Maria; Kuipers, Franciscus Antonius; de Niet, Edmond; and Druyvesteyn, Willem Frederik, 4,041,478, Cl. 340-174.0TF.
Dubois, Jean-Claude; and Gazard, Maryse, to Thomson-CSF. Method for producing a silica mask on a semiconductor substrate. 4,041,190, Cl. 427-43.000.
Dubois, Jean Claude: *See*—
Leclerc, Pierre; and Dubois, Jean Claude, 4,041,191, Cl. 427-43.000.
Dumont, Pierre; and Moise, Alain, to Commissariat a l'Energie Atomique. Furnace having ceramic heating elements. 4,041,236, Cl. 13-25.000.
Duncan, Farris N.: *See*—
Bamburg, Robert A.; Duncan, Farris N.; and Floyd, Roger M., 4,040,558, Cl. 229-23.0BT.
Dunlop Limited: *See*—
Mitchell, William Eric, 4,040,465, Cl. 152-381.100.
Dunphy, Gerald P.: *See*—
Penton, Hugh V.; Dunphy, Gerald P.; and Stevens, Clayton O., 4,040,194, Cl. 40-142.00A.
Dunstan, Harvey John: *See*—
Gulliford, Henry Howard; and Dunstan, Harvey John, 4,041,385, Cl. 324-71.0CP.
Dunster, Donald E.: *See*—
Miller, Dale E.; Chapman, William L.; Dunster, Donald E.; and Thomas, Bobby J., 4,041,372, Cl. 324-9.000.
Du Pont de Nemours, E. I., and Company: *See*—
Bursey, Maurice M.; Hinton, Deborah M.; Sammons, Martin C.; and Wightman, R. Mark, 4,041,346, Cl. 313-336.000.
Cooper, John LaMonte; and Newnam, James Alvis, 4,040,371, Cl. 112-420.000.
Jenkins, Francis Edward; and Tynan, Daniel Gregory, 4,041,115, Cl. 264-5.000.
Dussaussoy, Pierre, to Commissariat a l'Energie Atomique. Manufacturing process of porous tubular members. 4,041,195, Cl. 264-60.000.
Dvonch, William; and Alburn, Harvey E., to American Home Products Corporation. Antitumor derivatives of periodate-oxidized cytidine. 4,041,037, Cl. 260-256.40C.
Dyer, Robert H.; Fowler, Andrew H.; and Vanstrum, Paul R., to United States of America, Energy Research and Development Administration. Method and apparatus for rapid adjustment of process gas inventory in gaseous diffusion cascades. 4,040,801, Cl. 55-16.000.
Dykes, Donald L.: *See*—
Swindler, David L.; and Dykes, Donald L., 4,041,260, Cl. 200-50.00A.
Dynamics Corporation of America: *See*—
Waeldner, William J.; and Harris, William J., 4,040,564, Cl. 236-49.000.
Dynamics Research Corporation: *See*—
Stuart, Robert W., 4,041,466, Cl. 364-900.000.
Dynamit Nobel Aktiengesellschaft: *See*—
Budich, Wolfgang, 4,040,219, Cl. 52-209.000.
E M I Limited: *See*—
Hounsfield, Godfrey Newbold, 4,041,315, Cl. 250-360.000.
E. R. Squibb & Sons, Inc.: *See*—
Brown, William E.; Baughn, Charles O.; and Linkenheimer, Wayne H., 4,041,175, Cl. 424-311.000.
Morcos, Nabil A.; Bruno, Gerald A.; and Haney, Thomas A., 4,041,317, Cl. 250-432.0PD.
Pagnucco, Rinaldo G.; Muse, Roberta J.; and Murty, Dasika R., 4,041,147, Cl. 195-103.50A.
Sipos, Frank; and Keseleski, Adam J., 4,041,232, Cl. 536-17.000.
Earl, Douglas B.: *See*—
Krossa, Kenneth D.; and Earl, Douglas B., 4,041,471, Cl. 364-200.000.
Earl, William A.: *See*—
Sass, Daniel B.; Earl, William A.; and Fasano, Joseph, 4,040,692, Cl. 312-194.000.
Eastman Kodak Company: *See*—
Kern, Frederick William, 4,041,510, Cl. 354-217.000.
Pacifici, James G.; Newland, Gordon C.; and Beard, Hobert M., Jr., 4,040,923, Cl. 204-159.150.
Pond, David Martin; and Wang, Richard Hsu-Shien, 4,041,011, Cl. 260-45.8NT.
Wang, Richard H. S.; Newland, Gordon C.; and Pacifici, James G., 4,040,922, Cl. 204-159.150.
Yen, Edward Chen-Hsiung; and Jenssen, Thomas Arthur, 4,040,886, Cl. 156-350.000.
Eaton Corporation: *See*—
Boyd, Keith A., 4,040,272, Cl. 64-26.000.
Knapp, Kenneth K.; and Koch, William E., 4,040,254, Cl. 60-420.000.
Meyer, Bengt E., 4,040,281, Cl. 72-10.000.
Petrus, Stephen, 4,040,463, Cl. 151-41.750.
Tappan, Harold B.; and Corwin, John Roy, 4,040,312, Cl. 74-801.000.
Uppal, Sohan, 4,040,439, Cl. 137-115.000.
Ebauches S.A.: *See*—
Chetelat, Fernand, 4,040,245, Cl. 58-4.00A.
Laesser, Claude, 4,040,248, Cl. 58-38.00R.
Eby, Harry J.; and Morgan, Neal O., to United States of America, Agriculture. Apparatus and method for treating waste products. 4,040,810, Cl. 71-9.000.
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Edge, Gordon Malcolm: *See*—
Plows, Graham Stuart; and Edge, Gordon Malcolm, 4,041,532, Cl. 358-128.000.
Edison Price, Inc.: *See*—
Goodbar, Isaac, 4,040,725, Cl. 350-263.000.
Edison, Robert G. Toothpick and container assembly. 4,040,433, Cl. 132-89.000.

Edson Corporation, The: *See—*
Atkins, Frederick Joseph; and Keene, Henry Rich, 4,040,375, Cl. 114-160.000.
Edwards, Bryant, to Illinois Tool Works Inc. Double-walled cup construction for interlocking in nested stacks to seal a food concentrate between adjacent cups. 4,040,537, Cl. 220-9.00R.
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Eggers, Frank W., III; Wigger, Ralph O.; and Coan, Richard L., to Cerro Corporation. Removing chlorine-containing insulation with a fluidized medium containing reactive calcium compounds. 4,040,865, Cl. 134-7.000.
Eguchi, Taro: *See—*
Hino, Masanori; Eguchi, Taro; and Shiraga, Chitoshi, 4,040,503, Cl. 181-192.000.
Eide, Ove; and Clausen, Carl F., to A/S Hoyer-Ellefsen. Arrangement in or relating to drainage. 4,040,263, Cl. 61-86.000.
Einhorn, Ruediger, to Coats & Clark, Inc. Mounting eye. 4,040,149, Cl. 248-493.000.
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Ellis, Michael L., to ICC, Inc. Bi-directional digital communication network. 4,041,398, Cl. 325-308.000.
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Baillargeon, John L.; and Clifford, Leonard W., 4,040,406, Cl. 123-146.50A.
Elzinga, Eugene Robert, to Exxon Research and Engineering Company. Fuel cells and methods of operating them. 4,040,435, Cl. 429-14.000.
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Swain, Leonard W.; and Bower, Allen M., 4,040,455, Cl. 141-225.000.
Emerson, James Wade, to Clupak, Inc. Production of high strength packaging papers from straw. 4,040,899, Cl. 162-13.000.
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Mahr, Rene N.; and Engel, Aloyse J., 4,040,530, Cl. 214-35.00R.
Engel, Stephen August, to Union Carbide Corporation. Method for producing an individual fin-free spot scarfing cut. 4,040,871, Cl. 148-9.500.
Engelhard Minerals & Chemicals Corporation: *See—*
Isaac, Peter A. H.; and Oulton, T. Dixon, 4,040,648, Cl. 282-27.500.
Engine Research: *See—*
Billings, Roger Evan; and Lynch, Franklin Earl, 4,040,398, Cl. 123-44.00R.
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English Electric Valve Company Limited: *See—*
Davis, Peter Robert, 4,041,349, Cl. 315-3.500.
Enoksen, Gerald E., to Ralph Ogden. Input line voltage compensating transformer power regulator. 4,041,431, Cl. 336-160.000.
Epstein, Harry, to Kastar, Inc. Multi-function tester with removable circuit cartridge. 4,041,380, Cl. 324-51.000.
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Makeev, Boris Anatolievich; Stepochkin, Lev Mikhailovich; Korot, Garri Moiseevich; Batozsky, Vadim Ivanovich; Khodorov, Alexandr Iosifovich; Zhuravlev, Vitaly Ivanovich; and Eremenko, Adolf Grigorievich, 4,040,318, Cl. 83-71.000.
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Gotz, Martin, 4,040,553, Cl. 226-151.000.
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Hughes, James K.; and Erickson, Wayne K., 4,040,155, Cl. 28-248.000.
Ernst Leitz G.m.b.H.: *See—*
Broemer, Heinz; and Meinert, Norbert, 4,040,846, Cl. 106-47.00Q.
Errut Products Limited: *See—*
Fairweather, Ernest Sidney; and Jackson, Philip, 4,040,668, Cl. 299-39.000.
Esco Corporation: *See—*
Leisure, Everett R., 4,040,901, Cl. 162-251.000.
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Essilor International (Compagnie Generale d'Optique): *See—*
Tagnon, Luc Andre, 4,040,752, Cl. 356-249.000.
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Zemanek, Zdenek S.; and Brown, Jack M., 4,041,426, Cl. 335-131.000.
Ethyl Corporation: *See—*
Fanning, Robert J., 4,041,057, Cl. 260-410.90R.
Laborde, Joseph N., 4,040,231, Cl. 52-664.000.
Marsee, Frederick J., 4,040,401, Cl. 123-117.00A.
Snyder, Louis J., 4,040,299, Cl. 73-421.50R.
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Evans, Paul F., to Xerox Corporation. Multicolor imaging method and imaged member employing combinations of transparent toner and colorant. 4,040,828, Cl. 96-1.200.
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Ewing, Joan R.: *See—*
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Ewing, Keith E.: *See—*
Davis, James L.; and Ewing, Keith E., 4,041,440, Cl. 338-195.000.
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Moss, Gerald, 4,041,141, Cl. 423-571.000.
Vannice, M. Albert, 4,041,087, Cl. 260-652.00R.
Whittingham, M. Stanley, 4,040,917, Cl. 204-92.000.
Ezekiel, Aaron David: *See—*
Steiger, Rolf; Reber, Jean-Francois; Ezekiel, Aaron David; and Ficken, Geoffrey Ernest, 4,040,825, Cl. 96-1.700.
F. lli Marzoli & C. S.p.A.: *See—*
Marzoli, Angelo, 4,040,145, Cl. 19-81.000.
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Winkler, Emil; and Kappler, Manfred, 4,040,729, Cl. 351-137.000.
Fabian, Arthur C.; Genzer, Jerome D.; Kasulanis, Charles Francis; Shavel, John, Jr.; and Zinnes, Harold, to Warner-Lambert Company. Intermediate composition. 4,041,042, Cl. 260-301.000.
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Robinson, Barry J., 4,041,326, Cl. 307-216.000.
Fairweather, Edwin William: *See—*
Rady-Pentek, Arthur A.; and Fairweather, Edwin William, 4,040,855, Cl. 106-90.000.
Fairweather, Ernest Sidney; and Jackson, Philip, to Errut Products Limited. Groove cutting apparatus. 4,040,668, Cl. 299-39.000.
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Gothel, Herbert; Cornils, Boy; Feichtinger, Hans; Tummes, Hans; and Falbe, Jurgen, 4,041,080, Cl. 260-585.00B.
Fanning, Robert J., to Ethyl Corporation. Hydroesterification process. 4,041,057, Cl. 260-410.90R.
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Alstad, Jorolf; and Farbu, Leif, 4,041,125, Cl. 423-21.000.
Farcnik, Alexander. Making fireproof non-polluting liquid coating composition. 4,041,000, Cl. 260-29.60B.
Farrell, John Jerome, to Consupak, Inc. Rotating core rods. 4,040,203, Cl. 432-124.000.
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Sass, Daniel B.; Earl, William A.; and Fasano, Joseph, 4,040,692, Cl. 312-194.000.
Fastner, Thorwald, to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft. Method of continuously casting steel. 4,040,470, Cl. 164-58.000.
Fauran, Claude P.; Bourgery, Guy R.; Raynaud, Guy M.; and Gouret, Claude J., to Delalande S.A. Arylamino pyrimidinic derivatives. 4,041,030, Cl. 544-117.000.
Fauran, Claude P.; Bourgery, Guy R.; and Gouret, Claude J., to Delalande S. A. Acetamidoxime compounds. 4,041,072, Cl. 260-558.00A.
Faust, Hans B., to Weber Marking Systems, Inc. Magnetically held printing mat. 4,040,351, Cl. 101-382.0MV.
Fedde, Chris Steven, to Motorola, Inc. Environmentally sensitive transmit power maximizing circuitry and method. 4,041,396, Cl. 325-150.000.
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Gothel, Herbert; Cornils, Boy; Feichtinger, Hans; Tummes, Hans; and Falbe, Jurgen, 4,041,080, Cl. 260-585.00B.
Feisel, Armin: *See—*
Gramespacher, Herbert; and Feisel, Armin, 4,040,316, Cl. 82-32.000.
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Brave, Ronald M.; Brave, Dennis G.; and Feldeman, Arnold S., 4,041,265, Cl. 200-159.00R.
Felix, Arthur Martin; and Liebman, Arnold Alvin, to Hoffmann-La Roche Inc. Labelled peptides. 4,041,023, Cl. 260-112.50R.
Fenichel, Richard L.; and Levin, Howard J., to American Home Products Corporation. Long acting somatostatin composition. 4,041,155, Cl. 424-177.000.
Fenoglio, David J., to Standard Oil Company (Indiana). Fire retardants. 4,041,016, Cl. 260-45.85E.
Fernaeus, Sven Evert; and Jonsson, Erik Anselm. Building block with wave-shaped upper and lower support surfaces. 4,040,226, Cl. 52-594.000.
Ferris, Robert C., to Christiana Industries Corporation. Method for manufacturing insulated grounding straps. 4,040,176, Cl. 29-624.000.

Ferro Manufacturing Corporation: *See*—
Pickles, Joseph, 4,040,591, Cl. 248-394.000.
Fetherston, William H.; and Theriault, Maurice N., to Composite Structures Corporation. Binding for water ski. 4,040,137, Cl. 9-310.0AA.
Feuersanger, Alfred E.; and Shortt, Brian A., to GTE Laboratories Incorporated. Bonded magnetic bubble memory. 4,041,447, Cl. 340-174.0TF.
F'Geppert, Erwin, to United States of America, Army. Manual controller for vehicle level adjustment. 4,040,647, Cl. 280-766.000.
F'Geppert, Erwin, to United States of America, Army. Anti-friction bearing. 4,040,686, Cl. 308-201.000.
Fiat-Allis Construction Machinery, Inc.: *See*—
Beveridge, Thomas Anthony, 4,040,505, Cl. 184-6.280.
Ficken, Geoffrey Ernest: *See*—
Steiger, Rolf; Reber, Jean-Francois; Ezekiel, Aaron David; and Ficken, Geoffrey Ernest, 4,040,825, Cl. 96-1.700.
Fields, Ellis K., to Standard Oil Company a corporation of Indiana. Process for beta-hydroxyalkylsulfoxides. 4,040,921, Cl. 204-158.00R.
Filak, Paul T.: *See*—
Waddington, William T.; Jenkins, Harold F.; and Filak, Paul T., 4,040,711, Cl. 339-198.00R.
Finney, Robert H., to Lord Corporation. Laminated bearing. 4,040,690, Cl. 308-237.00R.
Firestone, Raymond A.; Cama, Lovji D.; and Christensen, Burton G., to Merck & Co., Inc. Acylimine cephalosporins. 4,041,029, Cl. 544-25.000.
Firestone Tire & Rubber Company, The: *See*—
Walker, Ronald Jay; Sherwin, Dewayne James; and Rumpf, Robert John, 4,040,576, Cl. 242-107.40A.
Fischer, Charles F., to Colgate-Palmolive Company. Method for producing variegated soap. 4,041,119, Cl. 264-75.000.
Fischer, Erwin: *See*—
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Fischer, Franz: *See*—
Helbig, Joachim; and Fischer, Franz, 4,041,154, Cl. 424-150.000.
Fischer, Jean Arnold: *See*—
Arfelt, Soren Christian Schoubye; Clausen, Ib Christian; Jensen, Johannes; Fynbo, Knud Hansen; and Fischer, Jean Arnold, 4,040,652, Cl. 292-167.000.
Fischer, Karl-Heinz: *See*—
Johne, Hans; Jentzsch, Arndt; Schumann, Gunter; Reichenberger, Roland; Kesselring, Horst; and Fischer, Karl-Heinz, 4,040,347, Cl. 101-349.000.
Fishbein, William; and Rittenbach, Otto, to United States of America, Army. Doppler radar system. 4,041,488, Cl. 343-8.000.
Fisher, Gordon Lloyd, to International Nickel Company, Inc., The. Method for producing regular electronickel or S nickel rounds from electroplating baths giving highly stressed deposits. 4,040,915, Cl. 204-12.000.
Fisher, Phillip Andrew: *See*—
Clegg, Gordon A.; Cull, Geoffrey Maurice; Fisher, Phillip Andrew; and Unsworth, William, 4,040,818, Cl. 75-58.000.
Fitzpatrick, Richard L., to Raymond Lee Organization, Inc., The, a part interest. Elements for supporting wheels above ground and device for connecting the elements. 4,040,521, Cl. 211-24.000.
Flagg, Raymond C. Refuse collecting and conveying vehicle. 4,040,638, Cl. 280-9.000.
Flagg, Raymond C. Refuse bag carrier. 4,040,644, Cl. 280-659.000.
Flanders, Robert D. Method for detachably sealing together the sections of a barrel container assembly. 4,040,372, Cl. 113-120.00L.
Flippin, Jarvis F. Golf club swing guide. 4,040,631, Cl. 273-186.00A.
Floyd, Roger M.: *See*—
Bamburg, Robert A.; Duncan, Farris N.; and Floyd, Roger M., 4,040,558, Cl. 229-23.0BT.
FMC Corporation: *See*—
Franko-Filipasic, Borivoj Richard; and Start, John Francis, 4,040,843, Cl. 106-15.0FP.
Makino, Shinobu, 4,040,303, Cl. 74-61.000.
Newhall, William F., 4,040,813, Cl. 71-121.000.
Westerman, David J.; McTamaney, Louis S.; and Kauber, David J., 4,041,331, Cl. 307-252.00Q.
Fong, Ronald A.; Latty, James A.; and McDonnell, Roger P., to Rohm and Haas Company. Flocculant composition and process. 4,041,006, Cl. 260-33.6UA.
Foote, Francis C., to Addressograph Multigraph Corporation. Data reading device. 4,041,279, Cl. 235-61.70B.
Forbes, James T., to UOP Inc. Sulfur recovery process. 4,041,131, Cl. 423-242.000.
Ford Motor Company: *See*—
Hetke, Adolf; Mohla, Prem P.; and Warrick, Robert J., 4,040,821, Cl. 75-134.00S.
Forestieri, Americo F.; Ratajczak, Anthony F.; and Sidorak, Leroy G., to United States of America, National Aeronautics and Space Administration. Solar cell shingle. 4,040,867, Cl. 136-89.00P.
Formica, Giuseppe: *See*—
Gradeff, Peter S.; and Formica, Giuseppe, 4,041,083, Cl. 260-617.00C.
Forskningsgruppe for Sjeldne Jordarter: *See*—
Alstad, Jorolf; and Farbu, Leif, 4,041,125, Cl. 423-21.000.
Forsthuber, Robert Franz Karl: *See*—
Kramer, Pieter; Compaan, Klaas; and Forsthuber, Robert Franz Karl, 4,041,530, Cl. 358-128.000.
Foseco International Limited: *See*—
Cartwright, John Edward, 4,041,199, Cl. 428-36.000.
Potier, Pierre Roger; and Sota, Tadamichi, 4,040,469, Cl. 164-56.000.
Foster, Edward J.: *See*—
Matz, Bjorn J.; and Foster, Edward J., 4,041,249, Cl. 179-100.1DR.
Foster, Howard F., Sr. Tensioning anchor. 4,040,602, Cl. 254-164.000.
Foster, Kenneth William Samuel, to Renold Limited. Multi-lobe cam for hydraulic piston-and-cylinder machines. 4,040,337, Cl. 91-491.000.
Foster, Raymond C.; and Humphries, James J., Jr., to Stone & Webster Engineering Corporation. Removal of acidic gases from hydrocarbon streams. 4,041,129, Cl. 423-234.000.
Fowler, Andrew H.: *See*—
Dyer, Robert H.; Fowler, Andrew H.; and Vanstrum, Paul R., 4,040,801, Cl. 55-16.000.
Frabetti, Alton J., Jr., to General Electric Company. Ortho-alkylation of phenols. 4,041,085, Cl. 260-621.00R.
Francis, Arthur W.: *See*—
Franklin, Robert E.; Francis, Arthur W.; and Tarancon, Gregorio, 4,041,136, Cl. 423-347.000.
Francisco, Herbert H.; Martocci, Anthony P.; and Beitel, Sydney B., to Bethlehem Steel Corporation. Method for vacuum metal cladding. 4,041,273, Cl. 219-121.0EM.
Francois, Bernard; Vernois, Michel; Martin, Paul; and Franta, Emile, to Agence Nationale de Valorisation de la Recherche (ANVAR). Very finely divided lithium and process for manufacturing same. 4,040,815, Cl. 75-.50B.
Frank Ellman Co., Inc.: *See*—
Winzelberg, Abraham, 4,040,285, Cl. 72-370.000.
Frank, Horst; and Langebach, Hans Peter, to Linde Aktiengesellschaft. Multistage cooling of crude hydrocarbon gases. 4,040,266, Cl. 62-121.000.
Franklin, Robert E.; Francis, Arthur W.; and Tarancon, Gregorio, to Union Carbide Corporation. Process for the production of silane. 4,041,136, Cl. 423-347.000.
Franklin, Wesley D. Self propelled excavating vehicle. 4,040,669, Cl. 299-56.000.
Franko-Filipasic, Borivoj Richard; and Start, John Francis, to FMC Corporation. Flame-retardant regenerated cellulose filaments containing oligomeric phosphonitrilic compounds. 4,040,843, Cl. 106-15.0FP.
Frankowski, Richard Edward Bronislaw, to RCA Corporation. Interelectrode open and short circuit tester. 4,041,374, Cl. 324-20.0CR.
Franks, C. Richard: *See*—
Schenker, Barry A.; and Franks, C. Richard, 4,040,939, Cl. 204-290.00F.
Franta, Emile: *See*—
Francois, Bernard; Vernois, Michel; Martin, Paul; and Franta, Emile, 4,040,815, Cl. 75-.50B.
Frantz, Robert Houston: *See*—
Shaffer, Howard Richard; and Frantz, Robert Houston, 4,040,703, Cl. 339-99.00R.
Frantzis, Paul D.: *See*—
Rzeszewski, Theodore S.; Frantzis, Paul D.; and Sideris, Sotirios, 4,041,535, Cl. 358-191.000.
Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H.: *See*—
Theurer, Josef; and Thole, Waldemar Friedrich, 4,040,292, Cl. 73-84.000.
Frazita, Richard F.; Lopez, Alfred R.; and Giannini, Richard J., to Hazeltine Corporation. Limited scan array antenna systems with sharp cutoff of element pattern. 4,041,501, Cl. 343-844.000.
Frederick, Leonard L. Modular leads frame with noise abatement system and pile feeder. 4,040,492, Cl. 173-1.000.
Freimark, Ronald J.; and Repay, Laszlo N., to Tenna Corporation. Collapsible adjustable length citizens-band antenna with coil concealing structure. 4,041,498, Cl. 343-749.000.
Frensch, Heinz: *See*—
Albrecht, Konrad; Frensch, Heinz; and Hartel, Kurt, 4,041,164, Cl. 424-263.000.
Fressineau, Jean-Louis; and Hubert, Maurice, to Compagnie Internationale pour l'Informatique. Microprogram controlled binary decimal coded byte operator device. 4,041,290, Cl. 235-156.000.
Freudeberg, Jurgen; and Von Osten, Reimer, to U.S. Philips Corporation. Character generator for the reproduction of characters. 4,041,482, Cl. 340-324.0AD.
Fried. Krupp Gesellschaft mit beschrankter: *See*—
Tack, Hans, 4,040,156, Cl. 29-96.000.
Friedman, Stanton L. Resilient exercise device. 4,040,620, Cl. 272-137.000.
Frossard, Emile; Schleuniger, Fritz; and Stadler, Bruno, to Brown, Boveri & Cie. Supervisory and control system for rotary machinery, particularly rotary electrical machines. 4,041,541, Cl. 361-27.000.
Frye, Norman V. Adjustable ground support for volleyball poles and the like. 4,040,214, Cl. 52-157.000.
Fuchs, Francis Joseph, Jr., to Western Electric Co., Inc. Pressure vessels. 4,040,284, Cl. 72-272.000.
Fuji Photo Film Co., Ltd.: *See*—
Arai, Atsuaki; Shiba, Keisuke; Yamada, Minoru; Furutachi, Nobuo; and Nakamura, Kotaro, 4,040,835, Cl. 96-56.500.
Arai, Atsuaki; Nakamura, Kotaro; Yamada, Minoru; and Furutachi, Nobuo, 4,040,836, Cl. 96-56.500.
Fujita, Yoshihiro, 4,041,308, Cl. 250-226.000.
Hayashi, Takao; and Matsukawa, Hiroharu, 4,041,193, Cl. 427-151.000.
Hinata, Masanao; Takei, Haruo; Miyasaka, Nobuaki; and Takahashi, Kenji, 4,040,833, Cl. 96-45.100.
Hinata, Masanao; Takei, Haruo; Sato, Akira; Ikeda, Tadashi; and Iwamoto, Atsuo, 4,040,841, Cl. 96-126.000.

Iwano, Haruhiko; and Shimamura, Isao, 4,040,834, Cl. 96-50.00A.
Kondo, Toshihiro, 4,041,513, Cl. 354-241.000.
Maekawa, Yukio; Satomura, Masato; and Umehara, Akira, 4,041,017, Cl. 260-47.0UA.
Matsuyama, Junichi; Hinata, Masanao; and Sato, Akira, 4,040,839, Cl. 96-64.000.
Ohmatsu, Hideki; and Ueda, Hirozo, 4,040,829, Cl. 96-6.000.
Sugiyama, Masatoshi; and Ogawa, Akira, 4,040,840, Cl. 96-84.00A.
Yamaguchi, Seiya, 4,040,838, Cl. 96-60.00R.

Fuji Photo Optical Co. Ltd.: *See—*
Ohshiro, Susumu, 4,040,413, Cl. 128-6.000.

Fujiki, Yoshinori; and Izumi, Fujio, to National Institute for Researches in Inorganic Materials. Process for preparing fibrous alkali metal titanate. 4,041,143, Cl. 423-598.000.

Fujioka, Kotaro; Tsuchihashi, Osami; Endo, Tetsuhiko; and Hirota, Masakazu, to Toray Industries, Inc. Method and apparatus for doubling and twisting a yarn by a two-step changeover system. 4,040,240, Cl. 57-34.0CP.

Fujita, Tsutomu: *See—*
Shidara, Keiichi; Goto, Naohiro; Maruyama, Eiichi; Hirai, Tadaaki; and Fujita, Tsutomu, 4,040,985, Cl. 252-501.000.

Fujita, Yoshihiro, to Fuji Photo Film Co., Ltd. Automatic control device for correcting filters. 4,041,308, Cl. 250-226.000.

Fujitsu Limited: *See—*
Takeda, Shiroh; Nagai, Yuji; and Suzuki, Takenori, 4,041,009, Cl. 260-42.180.

Fukagawa, Hiroshi: *See—*
Kitamura, Nobuo; Takada, Katsuo; and Fukagawa, Hiroshi, 4,041,401, Cl. 325-455.000.

Fukazawa, Koji, to Nittetsu Mining Company, Ltd. Froth flotation process for recovering sheelite. 4,040,519, Cl. 209-166.000.

Fukuda, Akira: *See—*
Tokunaga, Koichi; and Fukuda, Akira, 4,040,525, Cl. 214-6.00P.

Fukumoto, Noriyoshi. Button for clothes. 4,040,148, Cl. 24-108.000.

Fukuoka, Suguru: *See—*
Nagatugi, Shuzo; Miyagawa, Akira; and Fukuoka, Suguru, 4,040,879, Cl. 149-18.000.

Fukuroi, Takeo, to Yoshida Kogyo Kabushiki Kaisha. Slide fastener having discrete coupling elements. 4,040,150, Cl. 24-205.13R.

Fukushima, Masatoshi: *See—*
Iijima, Ryozo; Matsubara, Yukio; Yamaguchi, Ginichi; and Fukushima, Masatoshi, 4,040,937, Cl. 204-281.000.

Fukuzawa, Tadashi; Suzuki, Teruki; and Sato, Shigeru, to Hitachi, Ltd.; and Hitachi Medical Corporation. Radiographic phosphor screen. 4,041,319, Cl. 250-460.000.

Fuller, James Alec: *See—*
Liu, Charles Chung-Yeh; and Fuller, James Alec, 4,041,499, Cl. 343-756.000.

Funaki, Takashi, to Kabushiki Kaisha Sankyo Seiki Seisakusho. Method of manufacturing symbol indication drum. 4,040,160, Cl. 29-159.00R.

Furukawa Electric Co., Ltd., The: *See—*
Furuto, Yoshio; and Ban, Masaaki, 4,041,376, Cl. 324-33.000.

Furutachi, Nobuo: *See—*
Arai, Atsuaki; Shiba, Keisuke; Yamada, Minoru; Furutachi, Nobuo; and Nakamura, Kotaro, 4,040,835, Cl. 96-56.500.
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Furuto, Yoshio; and Ban, Masaaki, to Furukawa Electric Co., Ltd., The. Detector for detecting the state of electrically non-conductive or substantially electrically non conductive fluid. 4,041,376, Cl. 324-33.000.

Fuse, Noboru; and Muramoto, Kenichi, to Tokyo Shibaura Electric Co., Ltd. Vertical type junction field effect semiconductor device. 4,041,517, Cl. 357-22.000.

Fushiki, Isamu: *See—*
Sakamoto, Kenro; Fushiki, Isamu; and Koboshi, Sigeharu, 4,040,837, Cl. 96-60.0BF.

Futaba Denshi Kogyo K. K.: *See—*
Chusha, Hideo, 4,041,427, Cl. 335-205.000.
Eto, Goro; and Utamura, Yukihiko, 4,041,348, Cl. 313-497.000.

Fynbo, Knud Hansen: *See—*
Arfelt, Soren Christian Schoubye; Clausen, Ib Christian; Jensen, Johannes; Fynbo, Knud Hansen; and Fischer, Jean Arnold, 4,040,652, Cl. 292-167.000.

G. D. Searle & Co.: *See—*
Mueller, Richard A., 4,041,050, Cl. 260-345.700.
Zipper, Jaime A., 4,040,417, Cl. 128-130.000.

Gabrielsson, Arne Goran; and Lindstrom, Jan Erik, to Telefonaktiebolaget L M Ericsson. Low duty cycle pulse generator using two thyristors. 4,041,417, Cl. 331-107.00R.

GAF Corporation: *See—*
Boranian, Armen G.; and Timm, Walter C., 4,041,200, Cl. 428-40.000.
Ziegler, B. Randall, 4,040,851, Cl. 106-93.000.

Gaffar, Abdul: *See—*
Gaffar, Maria Corazon; Gaffar, Abdul; and Hauschild, John P., 4,041,149, Cl. 424-57.000.

Gaffar, Maria Corazon; Gaffar, Abdul; and Hauschild, John P., to Colgate-Palmolive Company. Composition and method of controlling and preventing mouth odor. 4,041,149, Cl. 424-57.000.

Gagne, Rudy L. Method for coating a substrate with plastic. 4,041,197, Cl. 427-278.000.

Gaia, Aldino J., to McGraw-Edison Company. Protector for electric circuit. 4,041,435, Cl. 337-159.000.

Galliot, Brigitte: *See—*
Chany, Charles; Galliot, Brigitte; Chevalier, Marie-Josephe; and Ankel, Helmut, 4,041,152, Cl. 424-85.000.

Gandolfi, Carmelo; Doria, Gianfederico; Pellegata, Renato; and Usardi, Maria M., to Carlo-Erba S.p.A. 16-Methyl prost-5-en-13-ynoic acid derivatives. 4,041,064, Cl. 560-121.000.

Garberick, Thayne K. Heat recovery apparatus. 4,040,477, Cl. 165-103.000.

Garcia, Onofre S. Wing to swim. 4,040,136, Cl. 9-302.000.

Gard, Inc.: *See—*
Peters, Walter A.; Hozian, Curtis A.; and Gusek, Richard W., 4,040,510, Cl. 194-2.000.

Garner, Albert Y., to Monsanto Research Corporation. Flame retardant. 4,040,780, Cl. 8-116.00P.

Garrett Corporation, The: *See—*
Richerson, David W.; and Schuyler, Donald R., II, 4,040,845, Cl. 106-38.900.

Garrett, William R.: *See—*
Kellner, Jackson M.; and Garrett, William R., 4,040,495, Cl. 175-73.000.

Garrick, Laurence James; and Simon, Rachel. Pneumatic systems and valves therefor. 4,040,655, Cl. 296-63.000.

Garrott, Warren A., Jr. Anaerobic waste treatment facility. 4,040,963, Cl. 210-219.000.

Garvey, Daniel C.: *See—*
Parker, George E.; and Garvey, Daniel C., 4,041,429, Cl. 335-276.000.

Gattuso, Marion J., to UOP Inc. Particularly substituted thiazolesulfenamides. 4,041,043, Cl. 260-306.60A.

Gaudeul, Bruno, to Iria Institut de Recherche D'Informatique et D'Automatique. Apparatus for the analysis of the operation of a system using binary signals. 4,041,281, Cl. 235-92.0PD.

Gaughan, Gerald E.: *See—*
Blajda, Raymond S.; Kantenwein, Robert W.; Gaughan, Gerald E.; and Sikra, John F., 4,040,359, Cl. 102-93.000.

Gauper, Harold A., Jr., to General Electric Company. Electromagnetically shielded electrical converter and an improved electromagnetic shield therefor. 4,041,364, Cl. 363-15.000.

Gauriat, Gilles; Vernezy, Jacques; and Barigot, Jean-Claude, to Compagnie Industrielle des Telecommunications Cit-Alcatel SA. System for simultaneous transmission of several pulse trains. 4,041,392, Cl. 325-38.00A.

Gazard, Maryse: *See—*
Dubois, Jean-Claude; and Gazard, Maryse, 4,041,190, Cl. 427-43.000.

Geckle, Raymond James: *See—*
Kahn, David; and Geckle, Raymond James, 4,040,808, Cl. 65-33.000.

Geeck, Joseph S. Chain saw blade sharpening accessory. 4,040,314, Cl. 76-78.00R.

Geer, Ernest C.: *See—*
Cook, Harold L., Jr.; Geer, Ernest C.; and Katz, Donald L., 4,040,487, Cl. 166-314.000.

Geiger, Dana F.: *See—*
Brosh, Amnon; and Geiger, Dana F., 4,041,289, Cl. 235-151.330.

Gembicki, Stanley A.; and Hammerman, John I., to UOP Inc. Hydrocarbon conversion catalytic composite. 4,040,979, Cl. 252-439.000.

General Atomic Company: *See—*
Mysels, Karol J., 4,040,902, Cl. 176-30.000.

General Dynamics: *See—*
Schertz, Charles W.; and Ritter, Edward H., 4,040,744, Cl. 356-152.000.
Slysh, Paul, 4,040,333, Cl. 89-37.50R.
Speer, Spencer J., 4,040,420, Cl. 128-218.00M.

General Electric Company: *See—*
Anthony, Thomas R.; and Cline, Harvey E., 4,040,869, Cl. 148-1.500.
Blount, Richard, 4,041,300, Cl. 240-1.300.
Boah, John K., 4,041,278, Cl. 219-411.000.
Carlson, Robert G., 4,040,770, Cl. 416-230.000.
Chang, Mike F.; Cline, Harvey E.; and Anthony, Thomas R., 4,040,868, Cl. 148-1.500.
Cline, Harvey E.; and Anthony, Thomas R., 4,040,171, Cl. 29-577.000.
Collins, Edward J.; and Medved, Donald C., 4,040,777, Cl. 431-95.00A.
Coppola, Patrick S.; and Kotansky, Stephen, 4,040,600, Cl. 251-63.000.
Cornell, Edward P., 4,041,361, Cl. 318-227.000.
Darrow, Kenneth A.; Kydd, Paul H.; and Daly, John W., 4,040,159, Cl. 29-156.80H.
Davis, Richard Kent, 4,041,405, Cl. 328-181.000.
Frabetti, Alton J., Jr., 4,041,085, Cl. 260-621.00R.
Gauper, Harold A., Jr., 4,041,364, Cl. 363-15.000.
Ghezzo, Mario, 4,040,893, Cl. 156-659.000.
Giaever, Ivar, 4,041,146, Cl. 424-1.000.
Greskovich, Charles D.; and Rosolowski, Joseph H., 4,040,848, Cl. 106-73.500.
Greskovich, Charles D.; and Rosolowski, Joseph H., 4,040,849, Cl. 106-73.500.
Howard, Webster L., 4,040,268, Cl. 62-335.000.
Jeram, Edward M., 4,041,010, Cl. 260-42.260.
LaGiusa, Frank F., 4,041,344, Cl. 313-113.000.
LeGrand, Donald G.; and Vitale, Gina G., 4,040,882, Cl. 156-106.000.
Marquardt, Robert Alden, 4,041,442, Cl. 340-6.00R.

McBride, Robert B.; and Tiberio, Phillip J., 4,040,790, Cl. 23-253.00C.
Morris, George E., 4,041,360, Cl. 318-221.00R.
Noeske, Heinz O., 4,041,263, Cl. 200-148.00A.
Orth, Edward D.; Roberts, John A.; and Smith, Raymond J. D., 4,040,936, Cl. 204-271.000.
Peak, Steven C.; and Anderson, Thomas E., 4,041,365, Cl. 363-58.000.
Prochazka, Svante, 4,041,117, Cl. 264-63.000.
Rich, Joseph A., 4,041,261, Cl. 200-144.00B.
Sargent, Paul L.; and Ghezzo, Mario, 4,040,892, Cl. 156-659.000.
Stevenson, Howard R., Jr., 4,041,485, Cl. 343-7.300.
Walden, John P., 4,041,544, Cl. 361-106.000.
Will, Fritz G.; and Holub, Fred F., 4,040,916, Cl. 204-55.00R.
Yerman, Alexander J., 4,040,874, Cl. 148-33.300.

General Engineering & Mfg. Corporation: *See—*
Wallace, Earl C.; and Bell, Richard A., 4,040,665, Cl. 297-417.000.
Wallace, Earl C., 4,040,881, Cl. 156-93.000.

General Foods Corporation: *See—*
Parliment, Thomas Holden, 4,041,185, Cl. 426-534.000.

General Mills Chemicals, Inc.: *See—*
Maske, Fred, 4,041,234, Cl. 536-114.000.

General Motors Corporation: *See—*
Davis, James L.; and Ewing, Keith E., 4,041,440, Cl. 338-195.000.
Huber, David A.; and Schoen, Roy C., 4,041,339, Cl. 310-239.000.
King, Charles W.; Ruff, Donald O.; and Sheldrake, Leonard J., 4,041,369, Cl. 322-99.000.
Koljonen, Vilho, 4,041,302, Cl. 240-8.300.
Madsen, John E.; and Drabik, Walter, 4,041,338, Cl. 310-186.000.
Pelchat, Paul F., 4,041,301, Cl. 240-2.130.
Robarge, Wilbur A., 4,041,539, Cl. 360-106.000.
Shellhause, Ronald L., 4,041,449, Cl. 340-52.00C.

General Steel Industries, Inc.: *See—*
Jackson, Keith L., 4,040,360, Cl. 105-136.000.
Jackson, Keith L., 4,040,361, Cl. 105-136.000.
McPherson, Gerry E., 4,041,198, Cl. 427-294.000.

General Tire & Rubber Company, The: *See—*
Kalafus, Edward Florent; and Sharma, Satish Chander, 4,040,999, Cl. 260-29.300.

Genini, Graziano, to Albatex A.G. Drawing gripper for gripping and transporting weft yarns in continuous weft feed looms. 4,040,454, Cl. 139-448.000.

Genzer, Jerome D.: *See—*
Fabian, Arthur C.; Genzer, Jerome D.; Kasulanis, Charles Francis; Shavel, John, Jr.; and Zinnes, Harold, 4,041,042, Cl. 260-301.000.

Georg Fischer Aktiengesellschaft: *See—*
Gramespacher, Herbert; and Feisel, Armin, 4,040,316, Cl. 82-32.000.
Henych, Ivo; Fischer, Erwin; and Reist, Jurg, 4,040,596, Cl. 249-117.000.

George, Flint R.: *See—*
Vann, Roy R.; and George, Flint R., 4,040,485, Cl. 166-297.000.

Gerber, Bernard: *See—*
Oguey, Henri J.; and Gerber, Bernard, 4,041,522, Cl. 357-42.000.

Gerdes, Claus-Holmer. Electrical heating element. 4,041,275, Cl. 219-307.000.

Gergen, William P.: *See—*
Davison, Sol; and Gergen, William P., 4,041,103, Cl. 260-857.00D.

Gerin, Merlin: *See—*
Buisson, Gaston; and Hennebert, Jacques, 4,041,356, Cl. 361-14.000.

Gerry, Martin E.: *See—*
Wotherspoon, John G., 4,040,211, Cl. 52-100.000.

Gershman, Mikhail Bentsionovich: *See—*
Axelrod, Shoya Samuilovich; Belozerov, Viktor Grigorievich; Gershman, Mikhail Bentsionovich; Margolin, Evel Grigorievich; and Shapot, Mikhail Borisovich, 4,041,218, Cl. 429-136.000.

Gerson, Samuel L. Teapot and lid combination. 4,040,538, Cl. 220-20.000.

Gertsch, Peter; and Wehrli, Alfons, to Maschinenfabrik Wifag. Ductor or film-transferring inking mechanism, particularly for offset presses. 4,040,348, Cl. 101-350.000.

Ghezzo, Mario, to General Electric Company. Method of selective etching of materials utilizing masks of binary silicate glasses. 4,040,893, Cl. 156-659.000.

Ghezzo, Mario: *See—*
Sargent, Paul L.; and Ghezzo, Mario, 4,040,892, Cl. 156-659.000.

Ghosez, Leon; Rossey, Guy; and Didderen, Freddy, to U C B, Societe Anonyme. N-benzyl-2,2-dimethoxy-acetamides. 4,041,077, Cl. 260-562.00R.

Giacino, Christopher: *See—*
Evers, William J.; Heinsohn, Howard H., Jr.; Vock, Manfred Hugo; and Giacino, Christopher, 4,041,186, Cl. 426-535.000.

Giaever, Ivar, to General Electric Company. Method for detection of biological particles. 4,041,146, Cl. 424-1.000.

Giannini, Richard J.: *See—*
Frazita, Richard F.; Lopez, Alfred R.; and Giannini, Richard J., 4,041,501, Cl. 343-844.000.

Gibb, James Francis, to Hartford Special Machinery Company, The. Clearing wheel assembly for thread rolling machine and the like. 4,040,542, Cl. 221-162.000.

Giddings & Lewis, Inc.: *See—*
Kolell, Norbert C.; and Conners, John P., 4,041,287, Cl. 235-151.110.

Giebel, Buddy E., to Union Camp Corporation. Carton with smooth reinforced hand hole. 4,040,559, Cl. 229-23.00R.

Giebel, Joseph L., to Mine Safety Appliances Company. Completely expendable mine anchor line cutting tool. 4,040,376, Cl. 114-221.00A.

Giffen, William M., Jr.: *See—*
Talsma, Herbert; and Giffen, William M., Jr., 4,041,005, Cl. 260-32.80A.

Giffen, William McAlpin; Pollitt, John Michael; and Clifford, Roy, to Auto Restraint Systems Limited. Seat-belt apparatus. 4,040,645, Cl. 280-745.000.

Gilgallon, Carl. Saddle for U-bolt clamp. 4,040,152, Cl. 24-277.000.

Giller, Heinz: *See—*
Achsel, Eberhard; Hortig, Hans-Peter; Seipp, Heinrich; and Giller, Heinz, 4,040,793, Cl. 23-273.00R.

Gillette Company, The: *See—*
Adinolfi, Rocco J., 4,040,432, Cl. 132-9.000.

Gilreath, Murvin Bruce. Bedding attachment system. 4,040,133, Cl. 5-320.000.

Girling Limited: *See—*
Newstead, Charles, 4,040,506, Cl. 188-72.500.

Girlock Limited of Belmore: *See—*
Ince, Bernard John, 4,040,291, Cl. 73-81.000.

Giroux, Pierre. Hydraulic torque converting wheel. 4,040,310, Cl. 74-688.000.

GKN Transmissions Limited: *See—*
Rolt, Anthony P. R.; Walker, Frederick J.; and Webb, Oswald, 4,040,271, Cl. 64-26.000.

Glaeser, Wolfgang; and Mathy, Wolfgang, to Starck, Hermann C. Process for the preparation of crystalline potassium tantalum fluoride. 4,041,138, Cl. 423-464.000.

Glance, Bernard, to Bell Telephone Laboratories, Incorporated. Method and apparatus for frequency stabilizing oscillators. 4,041,416, Cl. 331-96.000.

Glasgow, Luther Ellis. Crust former. 4,040,734, Cl. 425-218.000.

Glock, Eugene: *See—*
Ashworth, James G.; Glock, Eugene; Kelly, James G.; McLaughlin, James L.; and Merwin, Owen T., 4,040,431, Cl. 131-140.00P.

Glockler, Otto: *See—*
Kraus, Bernd; and Glockler, Otto, 4,040,408, Cl. 123-179.00L.

Gnecco, Rafael. Porcelain tooth and method of manufacture. 4,040,844, Cl. 106-35.000.

Goffe, William L.; Mammino, Joseph; and Ewing, Joan R., to Zerox Corporation. Imaging system of migration material in softenable layer. 4,040,826, Cl. 96-1PS.

Golcher, William Ernest: *See—*
Higgins, David, 4,040,544, Cl. 222-477.000.

Gold, Bernard Samuel; and Smithers, Peter Alan, to Roband Electronics Limited. Apparatus for generating alternating currents of accurately predetermined waveform. 4,041,367, Cl. 363-97.000.

Goldman, Abraham. Shielding holder for a syringe having indirect viewing means. 4,040,419, Cl. 128-215.000.

Goldwell GmbH Chemische Fabrik H.E. Dotter: *See—*
Wittersheim, Adam, 4,040,975, Cl. 252-359.00E.

Goodbar, Isaac, to Edison Price, Inc. Display illuminating structure. 4,040,725, Cl. 350-263.000.

Goodling, John S.; McDaniel, Gayner R.; and Steadham, Richard A., to Auburn Research Foundation. Poultry beak remover. 4,040,425, Cl. 128-303.140.

Goodman Equipment Corporation: *See—*
Kamner, Haim J., 4,040,308, Cl. 74-586.000.

Goralski, Christian T.; Pews, R. Garth; and Burk, George A., to Dow Chemical Company, The. 3,4,5-Trichloro-N,N-di(loweralkyl)-2-(mercapto) benzenesulfonamides. 4,041,073, Cl. 260-556.0AR.

Goransson, Per Staffan, to Kommanditbolaget Pemac Invention AB & Co. Latticed wire structure with a sound-absorbing material. 4,040,212, Cl. 52-145.000.

Gorsky, Egon; and Minknow, Morse. Timepiece with electronic chime generator. 4,040,246, Cl. 58-23.00R.

Gothel, Herbert; Cornils, Boy; Feichtinger, Hans; Tummes, Hans; and Falbe, Jurgen, to Ruhrchemie Aktiengesellschaft. Process for the production of primary amines. 4,041,080, Cl. 260-585.00B.

Goto, Naohiro: *See—*
Shidara, Keiichi; Goto, Naohiro; Maruyama, Eiichi; Hirai, Tadaaki; and Fujita, Tsutomu, 4,040,985, Cl. 252-501.000.

Goto, Tatsuo: *See—*
Inoyama, Tadao; Goto, Tatsuo; Takeyasu, Kiyoo; Ishimura, Hiroshi; and Suzuki, Junichi, 4,041,294, Cl. 235-151.110.

Gotschall, George E.: *See—*
Sekmakas, Kazys; and Gotschall, George E., 4,040,995, Cl. 260-22.0CQ.

Gottling, Helmut, to WABCO Westinghouse GmbH. Automatic fluid pressure cut-off safety device. 4,040,437, Cl. 137-102.000.

Gottschalk, Robert E.; and Saiki, Albert K., to Gottschalk, Robert E. Camera cradle tilt mechanism. 4,040,587, Cl. 248-185.000.

Gotz, Martin, to Erich Grau Stanzwerk fur Elektrobleche. Intermittent stock feed mechanism. 4,040,553, Cl. 226-151.000.

Gouret, Claude J.: *See—*
Fauran, Claude P.; Bourgery, Guy R.; Raynaud, Guy M.; and Gouret, Claude J., 4,041,030, Cl. 544-117.000.
Fauran, Claude P.; Bourgery, Guy R.; and Gouret, Claude J., 4,041,072, Cl. 260-558.00A.

Gradeff, Peter S.; and Formica, Giuseppe, to Rhodia, Inc. Process for the selective hydrogenation of the keto group in nonconjugated olefinic ketones. 4,041,083, Cl. 260-617.00C.

Gramespacher, Herbert; and Feisel, Armin, to Georg Fischer Aktiengesellschaft. Lathe bed. 4,040,316, Cl. 82-32.000.

Granges Oxelosunds Jarnverk AB: *See—*
Karlsson, Per-Olle, 4,041,379, Cl. 324-37.000.

Grant, Samuel Edward: *See—*
Bush, Thomas P., Jr.; and Grant, Samuel Edward, 4,040,459, Cl. 144-312.000.

Grass Valley Group, Inc., The: *See—*
Rayner, Bruce Leland; and Taylor, Gerald Graham, 4,041,527, Cl. 358-22.000.
Gravdahl, Eugen, to Telefonaktiebolaget L M Ericsson. Arrangement for carrying out random selection among a plurality of selectable devices in a telecommunication system. 4,041,458, Cl. 340-166.00R.
Great Lakes Carbon Corporation: *See—*
Baud, Michael F.; and Harvey, Jay A., 4,041,116, Cl. 264-29.500.
Green, Harry. Chord indicator for instruments having organ and piano-type keyboards. 4,040,324, Cl. 84-478.000.
Green, William P.: *See—*
Hattan, Mark, 4,040,462, Cl. 151-14.0CS.
Greene, Leonard M., to Safe Flight Instrument Corporation. Automatic pilot for a sailboat. 4,040,374, Cl. 114-144.00C.
Greene, Marvin, to Cities Service Company. Process of treating carbonaceous material with carbon dioxide. 4,040,976, Cl. 252-373.000.
Gregory, Don A.: *See—*
Harrington, James A.; and Gregory, Don A., 4,040,896, Cl. 156-645.000.
Grekov, Vladimir Borisovich: *See—*
Iodvalkis, Vitautas Jurgio; Nomitsas, Richardas Prano; Andreev, Anatoly Fedorovich; and Grekov, Vladimir Borisovich, 4,041,504, Cl. 354-23.00R.
Grell, Karl-Ludwig, to Industriewerk Schaeffler OHG. Novel cylindrical rollers. 4,040,688, Cl. 308-202.000.
Greskovich, Charles D.; and Rosolowski, Joseph H., to General Electric Company. Polycrystalline silicon articles containing boron by sintering. 4,040,848, Cl. 106-73.500.
Greskovich, Charles D.; and Rosolowski, Joseph H., to General Electric Company. Polycrystalline silicon articles by sintering. 4,040,849, Cl. 106-73.500.
Gressitt, Tillman Johnson, to Bell Telephone Laboratories, Incorporated. Quick connector for service wires. 4,040,701, Cl. 339-99.00R.
Gribens, Joel A.: *See—*
Simons, Charles W.; O'Neill, Gerald J.; and Gribens, Joel A., 4,041,148, Cl. 424-45.000.
Griffith, Inc.: *See—*
Griffith, Vernon D., 4,040,753, Cl. 401-186.000.
Griffith, Vernon D., to Griffith, Inc. Applicator instrument. 4,040,753, Cl. 401-186.000.
Gristina, Anthony G., to Howmedica, Inc. Trispherical prosthetic shoulder device. 4,040,131, Cl. 3-1.910.
Gritter, David James, to Borg-Warner Corporation. Three-phase, quasi-square wave VSCF induction generator system. 4,041,368, Cl. 322-47.000.
Grivsky, Eugene M., to Burroughs Wellcome Co. Anti-convulsant cinnamide compounds. 4,041,071, Cl. 260-558.00R.
Groeneweg, Abraham, to N. V. Optische Industrie "De Oude Delft". Optical apparatus for reproducing a pair of data images on a common photographic plane. 4,040,723, Cl. 350-203.000.
Groff, Alvin H., to Rockwell International Corporation. Absolute incremental hybrid shaft position encoder. 4,041,483, Cl. 340-347.00P.
Gross, James R., to Dow Chemical Company, The. Process for spinning absorbent articles from copolymers having a copolymerized crosslinker. 4,041,020, Cl. 260-79.30M.
Gross, James R.; and McFadden, Russell T., to Dow Chemical Company, The. Water swellable articles. 4,041,231, Cl. 526-317.000.
Gross, James Richard, to Dow Chemical Company, The. Absorbent articles and methods for their preparation. 4,041,228, Cl. 526-240.000.
Grosse, Aristid V., to A & T Development Corporation. Pillars, walls and buildings. 4,040,216, Cl. 52-169.130.
Grossman, Milton J.; and Lewis, Deanna Rose. Carton adapted to be stacked flat and snapped open. 4,040,560, Cl. 229-41.00B.
Grote & Hartmann: *See—*
Konnemann, Alfred, 4,040,713, Cl. 339-259.00R.
Grove, Leslie W., Jr.: *See—*
Clark, Joseph H.; and Grove, Leslie W., Jr., 4,040,289, Cl. 73-46.000.
Grover, Vijay K.; and Zachry, Woodie, to Airco, Inc. C-clamp ground adapters. 4,040,714, Cl. 339-264.00R.
Grundig E.M.V. Elektro-Mechanische Versuchsanstalt Max Grundig: *See—*
Tost, Heinrich, 4,040,385, Cl. 118-326.000.
Grune, Per Olof, to Asea Aktiebolag. Operating device for a contact device for a pre-insertion resistor in a high-voltage circuit breaker. 4,041,264, Cl. 200-148.00R.
Gruppo Lepetit S.p.A.: *See—*
Assandri, Alessandro; Lancini, Giancarlo; Volpe, Giancarlo; and Cavalleri, Bruno, 4,041,168, Cl. 424-273.000.
Pifferi, Giorgio; Omodei-Sale', Amedeo; and Consonni, Pietro, 4,041,048, Cl. 260-333.000.
Gryaznov, Vladimir Mikhailovich: *See—*
Smirnov, Viktor Sergeevich; Gryaznov, Vladimir Mikhailovich; Lebedeva, Valentina Ivanovna; Mischenko, Alexandr Petrovich; Polyakova, Victoria Petrovna; and Savitsky, Evgeny Mikhailovich, 4,041,093, Cl. 260-673.500.
GTE Automatic Electric (Canada) Ltd.: *See—*
Thomas, Robert M., 4,041,327, Cl. 307-231.000.
GTE Automatic Electric Laboratories Incorporated: *See—*
Beeman, Robert Herbert; and Tarr, Lloyd Arthur, 4,041,248, Cl. 179-84.0VF.
Boleda, Alberto; and Tracey, Robert J., 4,041,484, Cl. 340-347.0NT.
Brush, Douglas J.; Vonder, David L.; and Wilkis, Anthony J., 4,041,425, Cl. 335-129.000.
Oades, John Willson, 4,041,389, Cl. 325-3.000.
Owlett, David Donald, 4,041,421, Cl. 333-73.00W.
GTE Laboratories Incorporated: *See—*
Feuersanger, Alfred E.; and Shortt, Brian A., 4,041,447, Cl. 340-174.0TF.
McNeill, William H.; Haugsjaa, Paul O.; Lech, Joseph; and Regan, Robert J., 4,041,352, Cl. 315-248.000.
GTE Sylvania Incorporated: *See—*
Neuber, Ralph E.; and Rehkopf, Charles H., 4,040,708, Cl. 339-111.000.
Pisano, John J., 4,040,707, Cl. 339-111.000.
Guardian Electric Manufacturing Co.: *See—*
Hrynewycz, Orest, 4,041,430, Cl. 336-92.000.
Guglielmo, Joe H. Flexible back pack frame. 4,040,548, Cl. 224-25.00A.
Guillen, Rafael. Adjustable aerosol can holder. 4,040,543, Cl. 222-473.000.
Gulf Research & Development Company: *See—*
Bacha, John D.; and Selwitz, Charles M., 4,040,911, Cl. 203-9.000.
Barie, Walter P., Jr.; Onopchenko, Anatoli; and Schulz, Johann G. D., 4,041,004, Cl. 260-32.8EP.
Innes, Robert A.; and Perrotta, Anthony J., 4,040,983, Cl. 252-469.000.
McKinney, Joel D.; and Mitchell, Bruce R., 4,040,945, Cl. 208-113.000.
Selwitz, Charles M., 4,040,956, Cl. 210-60.000.
Gulliford, Henry Howard; and Dunstan, Harvey John, to Coulter Electronics, Inc. On-line sampling system for monitoring particles suspended in a fluid. 4,041,385, Cl. 324-71.0CP.
Gulton Industries, Inc.: *See—*
Wagner, Herbert A., 4,040,738, Cl. 356-1.000.
Gurien, Harvey: *See—*
Christenson, James Gordon; Gurien, Harvey; and Teitel, Sidney, 4,041,040, Cl. 260-292.000.
Gusek, Richard W.: *See—*
Peters, Walter A.; Hozian, Curtis A.; and Gusek, Richard W., 4,040,510, Cl. 194-2.000.
Gushue, Edward J.: *See—*
Shepard, David H.; and Gushue, Edward J., 4,041,454, Cl. 340-146.30F.
Guzzetta, Joseph A.: *See—*
Pearne, Frank S.; Pearne, Florentin J.; Osborn, William P.; King, Terance M.; and Guzzetta, Joseph A., 4,040,532, Cl. 214-152.000.
H. & D. E. Watts: *See—*
Watts, Horace, 4,040,446, Cl. 137-625.170.
Haass, Adolf, to Siemens Aktiengesellschaft. Method and apparatus for the transmission of data. 4,041,239, Cl. 178-68.000.
Haferl, Peter Eduard, to RCA Corporation. Pincushion correction circuit. 4,041,354, Cl. 315-371.000.
Hafke, Carl: *See—*
Rudolph, Paul; Bierbach, Herbert; Kupfer, Hans; Hafke, Carl; and Kohlen, Rudolf, 4,040,800, Cl. 48-85.200.
Hahnke, Manfred; and Papenfuhs, Theodor, to Hoechst Aktiengesellschaft. Process for the preparation of symmetric 4-halogen-4',4''-diarylamino-triphenylmethane compounds. 4,041,054, Cl. 260-393.000.
Hall, John B.; Hruza, Denis E.; Vock, Manfred Hugo; Vinals, Joaquin; and Shuster, Edward J., to International Flavors & Fragrances Inc. Alkyl-2-methyl-3,4-pentadienoates. 4,041,069, Cl. 260-486.00R.
Hall, Kenneth M.: *See—*
Donahue, James T.; Hall, Kenneth M.; and Worth, Arthur J., 4,041,358, Cl. 361-365.000.
Halliburton Company: *See—*
Mosier, John E., 4,041,283, Cl. 235-150.200.
Halm Instrument Co., Inc.: *See—*
Harrison, Henry, 4,040,804, Cl. 55-158.000.
Hamaker, Ralph A.; and Carr, George Phillip, to Xerox Corporation. Development imaging methods. 4,040,827, Cl. 96-1.0LY.
Hamasaki, Nobuhiro: *See—*
Mizushima, Wataru; Nakata, Koreaki; Hamasaki, Nobuhiro; and Iida, Yoshio, 4,041,359, Cl. 361-433.000.
Hammann, Ingeborg: *See—*
Maurer, Fritz; Riebel, Hans-Jochem; Hammann, Ingeborg; and Stendel, Wilhelm, 4,041,158, Cl. 424-212.000.
Sirrenberg, Wilhelm; Schramm, Jurgen; Klauke, Erich; Hammann, Ingeborg; and Stendel, Wilhelm, 4,041,177, Cl. 424-322.000.
Hammerman, John I.: *See—*
Gembicki, Stanley A.; and Hammerman, John I., 4,040,979, Cl. 252-439.000.
Handler, Michael D.: *See—*
Mason, Stanley I., Jr.; Handler, Michael D.; and Richardson, James E., 4,040,568, Cl. 239-57.000.
Handtmann, Dieter; and Lavanchy, Jean-Pierre, to Robert Bosch GmbH. Opto-electronic sensor. 4,040,740, Cl. 356-4.000.
Hanewinkel, Lorenz, to Nixdorf Computer AG. Method and apparatus for the determination of the transition of digital data signals modulated with two different signal frequencies. 4,041,406, Cl. 329-107.000.
Haney, Thomas A.: *See—*
Morcos, Nabil A.; Bruno, Gerald A.; and Haney, Thomas A., 4,041,317, Cl. 250-432.0PD.
Hanford, William E. Apparatus for feeding chemicals to a liquid stream. 4,040,962, Cl. 210-206.000.
Hansel, William B., to Sun Oil Company of Pennsylvania. Dispenser member for filling fluid storage containers. 4,040,448, Cl. 138-42.000.
Hansel, William B., to Sun Oil Company of Pennsylvania. Gasoline tank fillpipe adapter. 4,040,458, Cl. 141-392.000.

Hansen, Guenter: *See—*
Maier, Karl; Hansen, Guenter; and Kermer, Wolf-Dieter, 4,041,025, Cl. 260-158.000.
Happy Sewing Machine Manufacturing Company: *See—*
Kaito, Yukio, 4,040,369, Cl. 112-258.000.
Hara, Hideo, to Kabushiki Kaisha Komatsu Seisakusho. Control system for a hydraulically actuated device such as the vibrator motor of a self-propelled vibratory compactor. 4,040,255, Cl. 60-445.000.
Harada, Shinichi, to Niles Parts Company, Limited. Switch having universal type actuator and guide plate. 4,041,258, Cl. 200-6.00A.
Hardy, Edgar E.: *See—*
David, Donald J.; and Hardy, Edgar E., 4,040,749, Cl. 356-201.000.
Haroules, George G.: *See—*
Ewen, Harold I.; and Haroules, George G., 4,041,494, Cl. 343-112.00D.
Harrington, James A.; and Gregory, Don A., to United States of America, Army. Chemical polish for BaF_2 and CaF_2. 4,040,896, Cl. 156-645.000.
Harris Corporation: *See—*
Belcher, Donald Keith, 4,041,410, Cl. 330-129.000.
Harris, Frank D., to Harris, Ralph D. Roof insulation support means. 4,040,224, Cl. 52-509.000.
Harris, Howard A., to Shell Oil Company. Ketoheterobicyclic grease thickeners. 4,040,968, Cl. 252-51.50A.
Harris, John L., to Deltrol Corporation. Automatic reset timer. 4,041,424, Cl. 335-75.000.
Harris, Ralph D.: *See—*
Harris, Frank D., 4,040,224, Cl. 52-509.000.
Harris, William J.: *See—*
Waeldner, William J.; and Harris, William J., 4,040,564, Cl. 236-49.000.
Harrison, Henry, to Halm Instrument Co., Inc. Heat and moisture exchanger. 4,040,804, Cl. 55-158.000.
Harrison, Robert Adams: *See—*
Walasewicz, Stanley John; Erickson, Virgil William; Harrison, Robert Adams; and Houghton, Royal Elwin, 4,040,409, Cl. 125-11.0AS.
Harry Ferguson Limited: *See—*
Rolt, Anthony P. R.; Walker, Frederick J.; and Webb, Oswald, 4,040,271, Cl. 64-26.000.
Hart, Gerald E. Doppler-radar terrain-clearance warning system. 4,041,341, Cl. 343-5.00R.
Hartel, Kurt: *See—*
Albrecht, Konrad; Frensch, Heinz; and Hartel, Kurt, 4,041,164, Cl. 424-263.000.
Hartford Special Machinery Company, The: *See—*
Gibb, James Francis, 4,040,542, Cl. 221-162.000.
Hartmann, Rudolf, to Bell & Howell Company. Automatic electronic rangefinder. 4,041,505, Cl. 354-25.000.
Hartshorn, David W.: *See—*
Whitehouse, David R.; and Hartshorn, David W., 4,041,351, Cl. 315-205.000.
Hartung, Klaus-Dieter: *See—*
Sudler, Roland; and Hartung, Klaus-Dieter, 4,041,336, Cl. 310-49.00R.
Harvey, Jay A.: *See—*
Baud, Michael F.; and Harvey, Jay A., 4,041,116, Cl. 264-29.500.
Harz, Kurt: *See—*
Voss, Eitel; Waldofner, Karl-Heinz; and Harz, Kurt, 4,040,789, Cl. 23-230.00A.
Hase, Yoshihiko: *See—*
Hayashi, Kiyoshige; Nakaniwa, Mikio; Kobayashi, Nobuyuki; Yamamoto, Minoru; and Hase, Yoshihiko, 4,040,946, Cl. 208-131.000.
Haskell, Harry Ainsworth, to AEP-International Ltd. Manually selectable switch arrays. 4,041,329, Cl. 307-247.00A.
Haswell, John W. Lift truck. 4,040,501, Cl. 180-89.180.
Hatakeyama, Nobuo: *See—*
Ohtsuka, Takaaki; Satake, Keigo; Yamazaki, Shiro; Hatakeyama, Nobuo; and Watanabe, Takeo, 4,041,170, Cl. 424-277.000.
Hatcher, Charles S.; and Atchley, Gary S., to Phillips Petroleum Company. Method and apparatus for restraining a yarn wad. 4,040,153, Cl. 28-221.000.
Hattan, Mark, to Green, William P., a part interest. Fasteners having threads formed of essentially helical coil structures. 4,040,462, Cl. 151-14.0CS.
Haugsjaa, Paul O.: *See—*
McNeill, William H.; Haugsjaa, Paul O.; Lech, Joseph; and Regan, Robert J., 4,041,352, Cl. 315-248.000.
Haus, Paul Z., Jr.: *See—*
Signorelli, John A.; and Haus, Paul Z., Jr., 4,040,279, Cl. 70-34.000.
Hauschild, John P.: *See—*
Gaffar, Maria Corazon; Gaffar, Abdul; and Hauschild, John P., 4,041,149, Cl. 424-57.000.
Hausman, LeeRoy W., Jr.: *See—*
Slutzky, Joel; Hausman, LeeRoy W., Jr.; and Kostenbauer, Ronald F., 4,041,463, Cl. 364-900.000.
Havlik, Jay M.: *See—*
Bosche, Earl E.; Havlik, Jay M.; and Kyle, James C., 4,040,256, Cl. 61-15.000.
Hawley, Laird V.: *See—*
Applequist, Quintin A.; and Hawley, Laird V., 4,040,643, Cl. 280-656.000.
Hay Handling Equipment Company: *See—*
Kenworthy, John B., 4,040,534, Cl. 214-766.000.
Hayakawa, Shigeru: *See—*
Nitta, Tsuneharu; Hayakawa, Shigeru; Kasahara, Yukio; and Terada, Ziro, 4,041,140, Cl. 423-561.00R.
Hayakawa, Tooru: *See—*
Edamoto, Akio; and Hayakawa, Tooru, 4,041,508, Cl. 354-128.000.
Hayashi, Kiyoshige; Nakaniwa, Mikio; Kobayashi, Nobuyuki; Yamamoto, Minoru; and Hase, Yoshihiko, to Maruzen Petrochemical Co., Ltd. Process for the production of a petroleum coke and coking crystallizer used thereof. 4,040,946, Cl. 208-131.000.
Hayashi, Takao; and Matsukawa, Hiroharu, to Fuji Photo Film Co., Ltd. Method for fanning each set of multi-ply sheets. 4,041,193, Cl. 427-151.000.
Hayashi, Toshiharu: *See—*
Makishima, Hiroshi; Hosoda, Minoru; Kasiwagi, Eiichi; and Hayashi, Toshiharu, 4,040,842, Cl. 106-1.000.
Haydon, Arthur W., to Tri-Tech, Inc. Clock drive apparatus. 4,040,247, Cl. 58-23.00R.
Hayosh, Thomas D.; and Torre, Anthony J., to Schiller Industries, Inc. Apparatus for generating polyphase scan patterns. 4,041,322, Cl. 250-568.000.
Haytayan, Harry M. Pneumatic apparatus. 4,040,554, Cl. 227-8.000.
Hazeltine Corporation: *See—*
Frazita, Richard F.; Lopez, Alfred R.; and Giannini, Richard J., 4,041,501, Cl. 343-844.000.
Hearp, Kathleen Seese: *See—*
Sharpe, Andrew Jackson, Jr.; Windhager, Robert H.; and Hearp, Kathleen Seese, 4,040,984, Cl. 252-500.000.
Heasman, Peter John Robert, to Imperial Chemical Industries Limited. Method of making fiber reinforced protective headgear. 4,041,031, Cl. 264-250.000.
Heberlein Maschinenfabrik AG: *See—*
Raschle, Josef, 4,040,242, Cl. 57-77.300.
Raschle, Josef, 4,040,244, Cl. 57-77.450.
Heger, Adolf; Passler, Helmar; and Bennemann, Frank, to VEB Textilkombinat. Method of enhancing high polymers, particularly textiles. 4,041,192, Cl. 427-43.000.
Hegyi, Eugenia. Adjustable container strainer and handle. 4,040,964, Cl. 210-238.000.
Heidelberger Druckmaschinen Aktiengesellschaft: *See—*
Jeschke, Willi, 4,040,349, Cl. 101-365.000.
Heine, Heinrich: *See—*
Kyri, Hans; Brandle, Karl; Muller, Martin; and Heine, Heinrich, 4,040,850, Cl. 106-87.000.
Heine, Joseph, to Robert Bosch GmbH. Internal combustion engine distributor-breaker unit holding and adjustment arrangement. 4,040,407, Cl. 123-146.50A.
Heinsohn, Howard H., Jr.: *See—*
Evers, William J.; Heinsohn, Howard H., Jr.; Vock, Manfred Hugo; and Giacino, Christopher, 4,041,186, Cl. 426-535.000.
Heintzelman, William J.; and Naiman, Michael I., to Petrolite Corporation. Reaction products of wax-anhydride compounds and polyamines. 4,041,056, Cl. 260-404.500.
Heitmann, Arnold M.; Brassert, Walter L.; and Chouinard, Donald N., to Northern Research and Engineering Corporation. Gas turbine combustion chamber arrangement. 4,040,251, Cl. 60-39.360.
Heiwig, Jane R.: *See—*
Roy, Alejo V.; and Heiwig, Jane R., 4,040,787, Cl. 23-230.00B.
Helbig, Joachim; and Fischer, Franz, to Verla-Pharm Arzneimittel-Fabrik Apotheker H. J. v. Ehrlich. Magnesium-containing pharmaceutical compositions. 4,041,154, Cl. 424-150.000.
Hellerman, Lance W.; and Hollyer, Richard S., to Marine Engineering Systems, Inc. Mobile offshore platform. 4,040,265, Cl. 61-91.000.
Henager, Charles H., to Battelle Development Corporation. Concrete joints. 4,040,220, Cl. 52-259.000.
Henkel & Cie GmbH: *See—*
Roebke, Wolfgang; Kneitel, Dieter; and Parr, Erfried, 4,040,972, Cl. 252-179.000.
Hennebert, Jacques: *See—*
Buisson, Gaston; and Hennebert, Jacques, 4,041,356, Cl. 361-14.000.
Henry, Michel Jacques, to UOP Inc. Fractionation of aromatic streams. 4,041,091, Cl. 260-672.00T.
Henson, Jesse L.: *See—*
Johnson, James B.; and Henson, Jesse L., 4,040,498, Cl. 180-68.00P.
Henych, Ivo; Fischer, Erwin; and Reist, Jurg, to Georg Fischer Aktiengesellschaft. Protective device for casting molds. 4,040,596, Cl. 249-117.000.
Hepher, Martin; Sperry, John Arthur; and Stewart, Malcolm John, to Autotype Company Limited, The. Dry transfer sheets. 4,041,204, Cl. 428-199.000.
Herbert, William J.: *See—*
Stine, Clifford R.; Klipec, Bruce E.; and Herbert, William J., 4,041,237, Cl. 174-36.000.
Hercules Incorporated: *See—*
Hopler, Robert B., Jr., 4,040,355, Cl. 102-22.00R.
Jenkins, Kennedy A., 4,041,194, Cl. 427-226.000.
Hergeth, Herbert; and Wirth, Walter, to Hergeth KG Maschinenfabrik und Apparatebau. Device for cleaning flock formed by natural fibers, especially cotton flock, of dirt particles. 4,040,948, Cl. 209-22.000.
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Hergeth, Herbert; and Wirth, Walter, 4,040,948, Cl. 209-22.000.
Herrmann, Manfred: *See—*
Satzinger, Gerhard; Herrmann, Manfred; and Vollmer, Karl-Otto, 4,041,166, Cl. 424-267.000.
Hersh, Lawrence K. Spoked wheel. 4,040,671, Cl. 301-58.000.
Herzog, Helmut; Bien, Hans-Samuel; and Hohmann, Walter, to Bayer

Aktiengesellschaft. Process for the preparation of anthraquinone compounds. 4,041,053, Cl. 260-381.000.
Hess, Nelson Claire, to B. F. Goodrich Company, The. Low pressure tire warning device. 4,040,380, Cl. 116-34.00R.
Hessel, Harold H.; and Kiele, Francis S., to Stewart-Hall Chemical Co. Chemical dispensing apparatus. 4,040,515, Cl. 206-.500.
Hessert, James E., to Phillips Petroleum Company. Gel formation by polymer crosslinking. 4,040,484, Cl. 166-294.000.
Hetke, Adolf; Mohla, Prem P.; and Warrick, Robert J., to Ford Motor Company. Nodularizing catalyst for cast iron and method of making same. 4,040,821, Cl. 75-134.00S.
Heverly, James S., to Westinghouse Electric Corporation. Elliptical seam welding apparatus. 4,040,557, Cl. 228-9.000.
Hewitt, Albert Thomas, to Chloride Group Limited. Alkaline electric storage batteries. 4,041,212, Cl. 429-89.000.
Hewlett-Packard Company: *See*—
Dalichow, Rolf W.; and Woodhull, Frederic W., 4,041,387, Cl. 324-78.00R.
Hey, Hansjorg: *See*—
Arpe, Hans-Jurgen; and Hey, Hansjorg, 4,041,039, Cl. 260-290.00R.
Muller, Werner Heinrich; Hey, Hansjorg; and Meidert, Helmut, 4,041,049, Cl. 260-343.500.
Heyne, Carl J.: *See*—
Pasculle, Maurice J.; Merrill, Edgar F.; and Heyne, Carl J., 4,041,543, Cl. 361-33.000.
Higgins, David, to Golcher, William Ernest. Material dispenser with snap-acting outlet valve. 4,040,544, Cl. 222-477.000.
Hight, Michael John; Winkle, Roy Victor; and Dale, John Robert, to U.S. Philips Corporation. Ultrasonic bonding apparatus. 4,040,885, Cl. 156-378.000.
Hightower, Tafari. Cutting instrument. 4,040,184, Cl. 30-298.000.
Hijikata, Akiko: *See*—
Okamoto, Shosuke; Kikumoto, Ryoji; Ohkubo, Kazuo; Tezuka, Tohru; Tonomura, Shinji; Tamao, Yoshikuni; and Hijikata, Akiko, 4,041,156, Cl. 424-177.000.
Hill, Andrew Joseph, to Raymond Lee Organization, Inc., The, a part interest. Clothing hanger guard. 4,040,545, Cl. 223-85.000.
Hill, Fred L. Row crop rogue vehicle. 4,040,238, Cl. 56-167.000.
Hill, John Carroll, to Integral Engineering & Manufacturing Corporation. Transmitter performance monitor and antenna matching system. 4,041,395, Cl. 325-133.000.
Hill, Max Lee; and Kimmel, Richard James, to Coleman Company Inc., The. Linkage for hinged tailgates. 4,040,654, Cl. 296-57.00R.
Hilliard Corporation, The: *See*—
Pauli, Ernest H., 4,040,757, Cl. 403-356.000.
Hillstrom, David U., to Marketing Displays, Inc. Panel framing device and method. 4,040,223, Cl. 52-483.000.
Hilti Aktiengesellschaft: *See*—
McCray, Walter A.; and Smith, Charles L., 4,040,471, Cl. 164-92.000.
Hinata, Masanao; Takei, Haruo; Miyasaka, Nobuaki; and Takahashi, Kenji, to Fuji Photo Film Co., Ltd. Radiographic process and sensitive material for the same. 4,040,833, Cl. 96-45.100.
Hinata, Masanao; Takei, Haruo; Sato, Akira; Ikeda, Tadashi; and Iwamoto, Atsuo, to Fuji Photo Film Co., Ltd. Silver halide photographic emulsion. 4,040,841, Cl. 96-126.000.
Hinata, Masanao: *See*—
Matsuyama, Junichi; Hinata, Masanao; and Sato, Akira, 4,040,839, Cl. 96-64.000.
Hindmarsh, Graham John: *See*—
Saunders, Arthur Frank; and Hindmarsh, Graham John, 4,040,250, Cl. 60-39.28R.
Hini, Paul, to Siemens Aktiengesellschaft. Arrangement for the generation of electrical signals by means of magnetic field-dependent semiconductor components. 4,041,371, Cl. 323-94.00H.
Hino, Masanori; Eguchi, Taro; and Shiraga, Chitoshi, to Onkyo Kabushiki Kaisha. Horn speaker. 4,040,503, Cl. 181-192.000.
Hinton, Deborah M.: *See*—
Bursey, Maurice M.; Hinton, Deborah M.; Sammons, Martin C.; and Wightman, R. Mark, 4,041,346, Cl. 313-336.000.
Hirabayashi, Yoichi: *See*—
Masaki, Katsumi; Hirayama, Kazuhiro; Sato, Yasushi; and Hirabayashi, Yoichi, 4,040,737, Cl. 355-49.000.
Hiraga, Yoichi: *See*—
Kikuchi, Mitsuo; and Hiraga, Yoichi, 4,041,134, Cl. 423-321.00S.
Hirai, Tadaaki: *See*—
Shidara, Keiichi; Goto, Naohiro; Maruyama, Eiichi; Hirai, Tadaaki; and Fujita, Tsutomu, 4,040,985, Cl. 252-501.000.
Hiramatsu, Tsutomu: *See*—
Matsuda, Yasumasa; Kimura, Ichiro; Sagawa, Akio; and Hiramatsu, Tsutomu, 4,040,294, Cl. 73-117.300.
Hirata, Yasuhumi: *See*—
Murakami, Masuo; Takahashi, Kozo; Hirata, Yasuhumi; Takashima, Mutsuo; Takeda, Masaaki; Ino, Hiroyoshi; and Iwanami, Sumio, 4,041,032, Cl. 260-250.0BN.
Hirayama, Kazuhiro: *See*—
Masaki, Katsumi; Hirayama, Kazuhiro; Sato, Yasushi; and Hirabayashi, Yoichi, 4,040,737, Cl. 355-49.000.
Hirling, Jozsef: *See*—
Szivos, Karoly; Lovass, Gyula; Liptak, Laszlo; Hirling, Jozsef; and Pavlik, Ozskar, 4,040,973, Cl. 252-301.10W.
Hirota, Masakazu: *See*—
Fujioka, Kotaro; Tsuchihashi, Osami; Endo, Tetsuhiko; and Hirota, Masakazu, 4,040,240, Cl. 57-34.0CP.
Hitachi, Ltd.: *See*—
Fukuzawa, Tadashi; Suzuki, Teruki; and Sato, Shigeru, 4,041,319, Cl. 250-460.000.
Inoyama, Tadao; Goto, Tatsuo; Takeyasu, Kiyoo; Ishimura, Hiroshi; and Suzuki, Junichi, 4,041,294, Cl. 235-151.110.
Kominami, Yasuo; Suzuki, Yukio; and Kawamura, Masami, 4,041,409, Cl. 330-29.000.
Matsuda, Yasumasa; Kimura, Ichiro; Sagawa, Akio; and Hiramatsu, Tsutomu, 4,040,294, Cl. 73-117.300.
Miyakawa, Nobuaki, 4,041,299, Cl. 364-841.000.
Mukaemachi, Takuzi; Toyama, Toshiaki; and Miyoshi, Taturu, 4,041,246, Cl. 179-18.0GF.
Ohhinata, Ichiro; Okuhara, Shinzi; and Tokunaga, Michio, 4,041,332, Cl. 307-252.00J.
Sekido, Kenzi; and Yoshikawa, Tsugio, 4,040,766, Cl. 415-9.000.
Shidara, Keiichi; Goto, Naohiro; Maruyama, Eiichi; Hirai, Tadaaki; and Fujita, Tsutomu, 4,040,985, Cl. 252-501.000.
Shimizu, Shinji; Iwamatsu, Seiichi; and Homma, Makoto, 4,041,518, Cl. 357-23.000.
Shoji, Fusaji; Kokaku, Hiroyoshi; Kohkame, Hisashi; and Kakefuda, Koiti, 4,041,108, Cl. 260-881.000.
Sunada, Masayoshi; and Kubokura, Kuniaki, 4,040,508, Cl. 192-12.00D.
Sunami, Hideo; Itoh, Yokichi; Inose, Fumiyuki; and Kamigaki, Yoshiaki, 4,041,521, Cl. 357-24.000.
Tashiro, Korefumi; and Ishikawa, Kosuke, 4,041,324, Cl. 307-91.000.
Todokoro, Hideo; and Komoda, Tsutomu, 4,041,316, Cl. 250-396.00R.
Hitachi Medical Corporation: *See*—
Fukuzawa, Tadashi; Suzuki, Teruki; and Sato, Shigeru, 4,041,319, Cl. 250-460.000.
Hitachi Shipbuilding & Engineering Co., Ltd.: *See*—
Inaba, Hideya; Ichiki, Masayoshi; and Wakiyama, Yoshinori, 4,040,981, Cl. 252-463.000.
Hlinka, Edward A.: *See*—
Kartasuk, Raymond H.; Smierciak, Walter R.; and Hlinka, Edward A., 4,040,613, Cl. 269-247.000.
Hoagland, Donald L.: *See*—
Evans, Norol T.; Pearlstein, Barry S.; Job, Merlin A.; and Hoagland, Donald L., 4,041,487, Cl. 343-7.500.
Hobart Corporation: *See*—
Morphy, Paul H., 4,040,166, Cl. 29-460.000.
Hochiki Corporation: *See*—
Miyabe, Atsushi, 4,041,479, Cl. 340-237.00S.
Hoechst Aktiengesellschaft: *See*—
Achsel, Eberhard; Hortig, Hans-Peter; Seipp, Heinrich; and Giller, Heinz, 4,040,793, Cl. 23-273.00R.
Albrecht, Konrad; Frensch, Heinz; and Hartel, Kurt, 4,041,164, Cl. 424-263.000.
Arpe, Hans-Jurgen; and Hey, Hansjorg, 4,041,039, Cl. 260-290.00R.
Hahnke, Manfred; and Papenfuhs, Theodor, 4,041,054, Cl. 260-393.000.
Huber, Bernd; and Kleiner, Hans-Jerg, 4,041,230, Cl. 526-278.000.
Hummel, Wolfgang, 4,040,732, Cl. 355-3.00R.
Hunger, Klaus, 4,041,036, Cl. 260-256.40F.
Muller, Werner Heinrich; Hey, Hansjorg; and Meidert, Helmut, 4,041,049, Cl. 260-343.500.
Winkelmann, Detlef; Lohr, Bernd; and Stieger, Helmut, 4,040,735, Cl. 355-10.000.
Hoekje, Howard H.; Carlson, Gordon A.; and Simmons, Robert B., to PPG Industries, Inc. Bipolar electrolyzer having silicon laminate backplate. 4,040,934, Cl. 204-256.000.
Hoff, Raymond E.; Pullukat, Thomas J.; and Shida, Mitsuzo, to Chemplex Company. Catalyst, method and polymerization processes. 4,041,224, Cl. 526-96.000.
Hoffmann-La Roche Inc.: *See*—
Avenia, Richard William; Christenson, James Gordon; and Pecherer, Benjamin, 4,041,076, Cl. 260-559.00A.
Christenson, James Gordon; Gurien, Harvey; and Teitel, Sidney, 4,041,040, Cl. 260-292.000.
Cohen, Noal; and Saucy, Gabriel, 4,041,058, Cl. 260-410.90R.
Felix, Arthur Martin; and Liebman, Arnold Alvin, 4,041,023, Cl. 260-112.50R.
Hogan, Gerard T.; and Weik, Kirby B., to UOP Inc. Vehicle seat with headrest movement responsive to seat back tilting. 4,040,661, Cl. 297-284.000.
Hohmann, Eugen: *See*—
Schwarz, Werner; Hohmann, Eugen; and Nickel, Bernd, 4,041,276, Cl. 219-308.000.
Hohmann, Walter: *See*—
Herzog, Helmut; Bien, Hans-Samuel; and Hohmann, Walter, 4,041,053, Cl. 260-381.000.
Holland, Dewey G.: *See*—
Bechara, Ibrahim S.; Carroll, Felix P.; Holland, Dewey G.; and Mascioli, Rocco L., 4,040,992, Cl. 260-2.5AW.
Hollyer, Richard S.: *See*—
Hellerman, Lance W.; and Hollyer, Richard S., 4,040,265, Cl. 61-91.000.
Holster, Peter Leendert; Ooms, Adam; and van den Hoogen, Marinus Johannes Gerardus, to U.S. Philips Corporation. Vibration amplitude transducer. 4,040,290, Cl. 73-71.000.
Holub, Fred F.: *See*—
Will, Fritz G.; and Holub, Fred F., 4,040,916, Cl. 204-55.00R.
Holzl, Robert A., to Chemetal Corporation. Deposition method. 4,040,870, Cl. 148-6.300.

Homma, Makoto: *See*—
Shimizu, Shinji; Iwamatsu, Seiichi; and Homma, Makoto, 4,041,518, Cl. 357-23.000.

Honda Giken Kogyo Kabushiki Kaisha: *See*—
Nakamura, Akihisa; Kamezaki, Takashi; Naito, Kenji; and Usui, Kunichika, 4,041,112, Cl. 261-72.00R.

Honda, Hidemasa: *See*—
Yamada, Yasuhiro; Honda, Hidemasa; and Kakiyama, Hitoo, 4,040,941, Cl. 208-8.000.

Honda, Yoichiro: *See*—
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Honeywell Inc.: *See*—
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Claypool, James P.; and Hoogenraad, Gerrit, 4,040,195, Cl. 40-341.000.

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Baturka, Walter, 4,040,764, Cl. 408-59.000.

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Kupec, Jiri; and Hrdlicka, Rehor, 4,041,384, Cl. 324-73.0PC.

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Parkyns, Raymond; and Hubble, Terence H., 4,040,322, Cl. 84-282.000.

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Fressineau, Jean-Louis; and Hubert, Maurice, 4,041,290, Cl. 235-156.000.

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Evans, Norol T.; Pearlstein, Barry S.; Job, Merlin A.; and Hoagland, Donald L., 4,041,487, Cl. 343-7.500.

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Foster, Raymond C.; and Humphries, James J., Jr., 4,041,129, Cl. 423-234.000.

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Niese, Karl; and Hundhausen, Eckhard, 4,040,457, Cl. 141-361.000.

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Hutson, Thomas, Jr., to Phillips Petroleum Company. Paraffin dehydrogenation using platinum-tin promoted zinc aluminate catalyst and silica-free particles. 4,041,099, Cl. 260-683.300.

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Hwa, Lim Ching. Methods and equipment for testing reflection points of transmission lines. 4,041,381, Cl. 324-52.000.

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Ellis, Michael L., 4,041,398, Cl. 325-308.000.

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Ide, Fumio; Kishida, Kazuo; and Osaka, Norihisa, to Mitsubishi Rayon Co., Ltd. Vinyl chloride polymer composition modified for transparency, impact and thermal resistance. 4,041,106, Cl. 260-876.00R.

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Iijima, Ryozo; Matsubara, Yukio; Yamaguchi, Ginichi; and Fukushima, Masatoshi, to Ryozo Iijima; and Onahama Seiren Kabushiki Kaisha. Mother blank for producing starting sheets used in electrolytic nonferrous metal production. 4,040,937, Cl. 204-281.000.

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Ikeda, Tuneo: *See*—
Oshima, Akira; Yoshihara, Keisuke; Shiki, Mikio; and Ikeda, Tuneo, 4,041,120, Cl. 264-171.000.

Ikeuchi, Hiroyuki: *See*—
Tsunashima, Kenji; Sugioka, Masanao; Soda, Atsuhiko; Ikeuchi, Hiroyuki; and Tanaka, Michihiko, 4,041,206, Cl. 428-409.000.

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Edwards, Bryant, 4,040,537, Cl. 220-9.00R.
Imahashi, Shigeyuki. Center cap for a wheel. 4,040,672, Cl. 301-108.00A.
Imboden, Walter H., to Burlington Industries, Inc. One-piece pantyhose construction. 4,040,128, Cl. 2-409.000.
Imperial Chemical Industries Limited: *See*—
Barlow, Charles Brian, 4,041,172, Cl. 424-304.000.
Heasman, Peter John Robert, 4,041,031, Cl. 264-250.000.
Main, Brian Geoffrey, 4,041,074, Cl. 260-556.0AR.
Smith, Leslie Harold, 4,041,075, Cl. 260-558.00P.
Snell, Brian Kenneth, 4,041,157, Cl. 424-200.000.
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McDougall, Ian Leitch, 4,040,173, Cl. 29-599.000.
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Ince, Bernard John, to Girlock Limited of Belmore. Hardness tester. 4,040,291, Cl. 73-81.000.
Industrial Solid State Controls, Inc.: *See*—
Slane, Francis L.; and Allison, Truman L., 4,041,470, Cl. 364-900.000.
Industriewerk Schaeffler OHG: *See*—
Grell, Karl-Ludwig, 4,040,688, Cl. 308-202.000.
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Slutzky, Joel; Hausman, LeeRoy W., Jr.; and Kostenbauer, Ronald F., 4,041,463, Cl. 364-900.000.
Ingram, Charles Junior: *See*—
Adams, Ralph Delta; and Ingram, Charles Junior, 4,040,345, Cl. 101-66.000.
Ingram, Roy Edward: *See*—
Salisbury, Ian David; and Ingram, Roy Edward, 4,041,548, Cl. 361-396.000.
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Murakami, Masuo; Takahashi, Kozo; Hirata, Yasuhumi; Takashima, Mutsuo; Takeda, Masaaki; Ino, Hiroyoshi; and Iwanami, Sumio, 4,041,032, Cl. 260-250.0BN.
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Sunami, Hideo; Itoh, Yokichi; Inose, Fumiyuki; and Kamigaki, Yoshiaki, 4,041,521, Cl. 357-24.000.
Inoue, Sakae: *See*—
Takada, Tsutomu; Kato, Shingo; Utsunomiya, Tadashi; and Inoue, Sakae, 4,041,207, Cl. 428-421.000.
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Alberny, Robert; and Vedda, Louis, 4,040,467, Cl. 164-49.000.
Institut Dr. Ing. Reinhard Straumann AG: *See*—
Steinemann, Samuel G.; and Perren, Stephan M., 4,040,129, Cl. 3-1.900.
Institut Francais du Petrole, des Carburants et Lubrifiants: *See*—
Cheron, Jacques, 4,040,598, Cl. 249-176.000.
Integral Engineering & Manufacturing Corporation: *See*—
Hill, John Carroll, 4,041,395, Cl. 325-133.000.
Intel Corporation: *See*—
Porat, Eli, 4,041,333, Cl. 307-279.000.
International Business Machines Corporation: *See*—
Belleson, James Garman; and Clark, Kendall, 4,040,745, Cl. 356-167.000.
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Chang, Kenneth; and Pittler, Marvin S., 4,040,891, Cl. 156-651.000.
Davis, Michael Ian; Mayes, Gary Wayne; McDermott, Thomas Stephen; and Wise, Larry Edward, 4,041,462, Cl. 364-200.000.
Kratz, Gary L.; Sproul, William W., III; Walendziewicz, Eugene T.; Wallis, Donald E.; and Dennis, Charles A., 4,041,461, Cl. 364-200.000.
Melcher, Robert Lee; and Shiren, Norman Steven, 4,041,536, Cl. 358-213.000.
Patrick, William John; and Westdorp, Wolfgang Alfred, 4,040,895, Cl. 156-618.000.
Sahni, Omesh, 4,041,345, Cl. 313-225.000.
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Dauby, Alain; Riso, Vladimir; and Roger-Rodes, Daniel, 4,041,296, Cl. 235-164.000.
International Flavors & Fragrances Inc.: *See*—
Evers, William J.; Heinsohn, Howard H., Jr.; Vock, Manfred Hugo; and Giacino, Christopher, 4,041,186, Cl. 426-535.000.
Hall, John B.; Hruza, Denis E.; Vock, Manfred Hugo; Vinals, Joaquin; and Shuster, Edward J., 4,041,069, Cl. 260-486.00R.
Light, Kenneth K.; Shuster, Edward J.; Vinals, Joaquin F.; and Vock, Manfred Hugo, 4,041,084, Cl. 260-617.00F.
Shuster, Edward J.; Withycombe, Donald Arthur; Mookherjee, Braja Dulal; and Mussinan, Cynthia J., 4,040,987, Cl. 252-522.000.
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Kestian, Anthony M.; and Allori, Raymond J., 4,040,499, Cl. 180-77.00R.
Wood, Gail E.; and Dickmeyer, Robert D., 4,040,309, Cl. 74-665.00T.
International Nickel Company, Inc., The: *See*—
Fisher, Gordon Lloyd, 4,040,915, Cl. 204-12.000.
Sadowski, Edward Peter, 4,041,274, Cl. 219-137.0WM.
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Baxter, Robert Olin; and Rothschild, Arthur Louis, III, 4,040,526, Cl. 214-10.50D.
Quick, James R.; and Wittosch, William A., Jr., 4,041,122, Cl. 264-277.000.
International Standard Electric Corporation: *See*—
Bauer, Werner, 4,041,366, Cl. 363-61.000.
International Telephone and Telegraph Corporation: *See*—
Conerly, Howard Jeffery, 4,041,465, Cl. 364-900.000.
Dean, John Richard, 4,041,305, Cl. 240-92.000.
Orthuber, Richard K., 4,041,343, Cl. 313-105.00R.
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Gaudeul, Bruno, 4,041,281, Cl. 235-92.0PD.
Irikura, Tsutomu, to Kyorin Pharmaceutical Co., Ltd. 1-(3-Phenylpropyl)-4-(beta-alkoxyacryloyl)piperazine derivatives. 4,041,038, Cl. 260-268.00C.
Isaac, Peter A. H.; and Oulton, T. Dixon, to Engelhard Minerals & Chemicals Corporation. Record sheets sensitized with reduced charge montmorillonite pigment. 4,040,648, Cl. 282-27.500.
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Barlow, Gordon A.; and Isaacson, Anson, 4,040,621, Cl. 273-85.00C.
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Nagata, Takashi; Ishibashi, Michio; and Nakajima, Yasuo, 4,041,335, Cl. 310-321.000.
Ishida, Akira: *See*—
Suzuki, Akira; Orihara, Ituo; and Ishida, Akira, 4,041,235, Cl. 428-413.000.
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Iwata, Hiroshi; and Ishikawa, Katsuji, 4,041,512, Cl. 354-234.000.
Ishikawa, Kosuke: *See*—
Tashiro, Korefumi; and Ishikawa, Kosuke, 4,041,324, Cl. 307-91.000.
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Inoyama, Tadao; Goto, Tatsuo; Takeyasu, Kiyoo; Ishimura, Hiroshi; and Suzuki, Junichi, 4,041,294, Cl. 235-151.110.
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Uchida, Yoshiaki; and Ishiwata, Kazuhiko, 4,040,666, Cl. 299-1.000.
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Yamada, Eiji; Ito, Hiroaki; and Akamatsu, Takashi, 4,041,051, Cl. 260-373.000.
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Sunami, Hideo; Itoh, Yokichi; Inose, Fumiyuki; and Kamigaki, Yoshiaki, 4,041,521, Cl. 357-24.000.
ITT Industries, Incorporated: *See*—
Bleckmann, Hans-Wilhelm, 4,040,677, Cl. 303-95.000.
Salisbury, Ian David; and Ingram, Roy Edward, 4,041,548, Cl. 361-396.000.
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Shimizu, Shinji; Iwamatsu, Seiichi; and Homma, Makoto, 4,041,518, Cl. 357-23.000.
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Hinata, Masanao; Takei, Haruo; Sato, Akira; Ikeda, Tadashi; and Iwamoto, Atsuo, 4,040,841, Cl. 96-126.000.
Iwanami, Sumio: *See*—
Murakami, Masuo; Takahashi, Kozo; Hirata, Yasuhumi; Takashima, Mutsuo; Takeda, Masaaki; Ino, Hiroyoshi; and Iwanami, Sumio, 4,041,032, Cl. 260-250.0BN.
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Fujiki, Yoshinori; and Izumi, Fujio, 4,041,143, Cl. 423-598.000.
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Saitoh, Kozo; and Izumi, Sumio, 4,040,949, Cl. 209-166.000.
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Jensen, Louis Theodore, 4,040,306, Cl. 74-334.000.
Schuck, Paul R.; and Baylor, John M., 4,040,261, Cl. 61-72.600.
J. M. Huber Corporation: *See*—
Wason, Satish K., 4,040,858, Cl. 106-288.00B.
Williams, Lloyd E.; Mays, Robert K.; and Wagner, Joseph E., III, 4,041,135, Cl. 423-329.000.
Jackson, Keith L., to General Steel Industries, Inc. Railway locomotive truck. 4,040,360, Cl. 105-136.000.

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Molins, Desmond Walter; and Jackson, Norman Walter, 4,040,341, Cl. 93-77.0FT.

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Leach, Paul A., 4,040,771, Cl. 417-62.000.

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Zodrow, Rudolf, 4,040,887, Cl. 156-384.000.

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Moore, Robert E.; and Janoski, Edward J., 4,041,086, Cl. 260-648.00F.

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Burysek, Frantisek; Mikulecky, Karel; and Janousek, Jan, 4,040,573, Cl. 242-35.50A.

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Javan, Ali, to Massachusetts Institute of Technology. Computer memory. 4,041,475, Cl. 340-173.0LS.

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Waddington, William T.; Jenkins, Harold F.; and Filak, Paul T., 4,040,711, Cl. 339-198.00R.

Jenkins, Kennedy A., to Hercules Incorporated. Decorative coating composition for coating glassware. 4,041,194, Cl. 427-226.000.

Jenkins, William A., to Monarch Marking Systems, Inc. Tag attaching apparatus. 4,040,555, Cl. 227-67.000.

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Drenckhan, Jurgen, 4,041,477, Cl. 340-173.200.

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Kraus, Walter R.; Kelch, David J.; and Jensen, Gerald A., 4,040,928, Cl. 204-195.00M.

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Johne, Hans; Jentzsch, Arndt; Schumann, Gunter; Reichenberger, Roland; Kesselring, Horst; and Fischer, Karl-Heinz, 4,040,347, Cl. 101-349.000.

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Demerson, Christopher A.; Humber, Leslie G.; Asselin, Andre A.; Jirkovsky, Ivo; and Dobson, Thomas A., 4,041,169, Cl. 424-274.000.

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Evans, Norol T.; Pearlstein, Barry S.; Job, Merlin A.; and Hoagland, Donald L., 4,041,487, Cl. 343-7.500.

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Krueger, Friedrich; and Schmidt, Guenter, 4,041,110, Cl. 260-938.000.

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Johne, Hans; Jentzsch, Arndt; Schumann, Gunter; Reichenberger, Roland; Kesselring, Horst; and Fischer, Karl-Heinz, to Veb Polygraph Leipzig Kombinat Fur Polygraphische Maschinen Und Ausrustungen. Inking arrangement for printing machine. 4,040,347, Cl. 101-349.000.

Johns-Manville Corporation: *See*—
Miiller, William Clyde, 4,040,847, Cl. 106-69.000.
Schairer, James Alfred, 4,040,563, Cl. 236-15.0BC.

Johnson, Arne I.: *See*—
Miessler, James D.; and Johnson, Arne I., 4,040,165, Cl. 29-458.000.

Johnson, Bruce K., to Polaroid Corporation. Photographic camera having external power supply. 4,041,514, Cl. 354-288.000.

Johnson, Bruce K.: *See*—
Baker, Philip G.; and Johnson, Bruce K., 4,040,751, Cl. 356-225.000.

Johnson, Clarence S., to United States of America, Navy. Diver's pulse stretch sonar. 4,041,441, Cl. 340-3.00R.

Johnson, David Emil, to Mobil Oil Corporation. Method and apparatus for replacing a roll of polystyrene foam sheet with empty core roll. 4,040,374, Cl. 242-56.00A.

Johnson, Harlan B.; Martinsons, Aleksandrs; and Snodgrass, John O., to PPG Industries, Inc. Method of activating an anode. 4,040,918, Cl. 204-98.000.

Johnson, Herbert Joe: *See*—
Rose, William Lester; and Johnson, Herbert Joe, 4,040,403, Cl. 123-133.000.

Johnson, James B.; and Henson, Jesse L., to W. B. Marvin Mfg. Co. Insect shield assembly. 4,040,498, Cl. 180-68.00P.

Johnson & Johnson: *See*—
Buck, Carl J., 4,041,061, Cl. 260-464.000.
Buck, Carl J., 4,041,062, Cl. 260-465.00D.
Buck, Carl J., 4,041,063, Cl. 260-465.400.

Johnson, Joseph E.; and Ostop, John A., to Westinghouse Electric Corporation. Method of making a transistor device. 4,040,877, Cl. 148-187.000.

Johnson, Lawrence P., to Western Cutlery Co. Locking blade knife. 4,040,181, Cl. 30-161.000.

Johnson Rubber Company, The: *See*—
Telle, Byron J.; and Sudyk, John R., 4,040,476, Cl. 165-76.000.

Jones, Allen, Jr. Steering and stabilization apparatus for watercraft. 4,040,373, Cl. 114-126.000.

Jones, Dennis A., to Amax Resource Recovery Systems, Inc. Lightweight aggregate. 4,040,852, Cl. 106-97.000.

Jones, James Allen: *See*—
Zipperian, Donald Edwin; Jones, James Allen; and Buza, Thomas Brian, 4,040,950, Cl. 209-166.000.

Jones, James E., to PPG Industries, Inc. Aqueous cationic electrodeposition of epoxy resins having quaternary groups carrying blocked NCO. 4,040,924, Cl. 204-181.000.

Jones, John Leslie, Sr. Urine trap diaper. 4,040,423, Cl. 128-287.000.

Jones, Lewis O., to Xerox Corporation. High surface area carrier. 4,040,969, Cl. 252-62.10R.

Jones, Robert E. Desk top work support device. 4,040,592, Cl. 248-460.000.

Jonsson, Erik Anselm: *See*—
Fernaeus, Sven Evert; and Jonsson, Erik Anselm, 4,040,226, Cl. 52-594.000.

Jopp, Wolfgang, to Passavant-Werke Michelbacher Hutte. Traveling band screen. 4,040,952, Cl. 210-400.000.

Jorgensen, George N.; King, Frank D.; and Butler, DeForest D., to Square D Company. Trench duct connector. 4,040,755, Cl. 403-205.000.

Jude Engineering Incorporated: *See*—
Christian, Robert Francis, 4,040,768, Cl. 416-122.000.

Juillard, Yves; and Riner, Victor, to Societe Alsacienne de Constructions Mecaniques de Mulhouse, of Mulhouse Cedex. Shuttleless loom of the single or double layer type. 4,040,453, Cl. 139-446.000.

Jung, Lothar. Method for the conversion of crystalline silica raw materials into amorphous silica. 4,040,795, Cl. 23-293.00R.

Jung, Michel: *See*—
Metcalf, Brian Walter; and Jung, Michel, 4,041,041, Cl. 260-293.860.

Jungner Instrument AB: *See*—
Kihlberg, Gunnar Axel, 4,041,293, Cl. 235-151.320.

Kaanders, Johannes Matheus Gerardus Maria, to U.S. Philips Corporation. Hearing aid to be worn behind the ear of the user and provided with a pressure-gradient microphone. 4,041,251, Cl. 179-107.0FD.

Kabushiki Kaisha Komatsu Seisakusho: *See*—
Hara, Hideo, 4,040,255, Cl. 60-445.000.

Kabushiki Kaisha Sankyo Seiki Seisakusho: *See*—
Funaki, Takashi, 4,040,160, Cl. 29-159.00R.

Kabushiki Kaisha Suwa Seikosha: *See*—
Ido, Kazuo; and Maruyama, Mitsuaki, 4,041,295, Cl. 235-156.000.

Kadin, Saul B.: *See*—
Bindra, Jasjit S.; and Kadin, Saul B., 4,041,163, Cl. 424-251.000.

Kahan, William; Rupinski, Fredrick Alexander; Wagner, John Francis; and Peer, Thomas Richard, to Singer Company, The. Automated home knitting machine with program card reader. 4,040,277, Cl. 66-154.00A.

Kahle, Glenn W.; and Olsen, Sydney A., to Deere & Company. Single shaft gas turbine engine with axially mounted disk regenerator. 4,040,249, Cl. 60-39.51H.

Kahn, David; and Geckle, Raymond James, to AMP Incorported. Method for manufacture of vanadium dioxide polyconductors. 4,040,808, Cl. 65-33.000.

Kahnt, Friedrich Werner: *See*—
Neher, Robert; and Kahnt, Friedrich Werner, 4,041,022, Cl. 260-112.50T.

Kaiser Aluminum & Chemical Corporation: *See*—
Loach, James A.; and Kirby, Harold R., 4,040,820, Cl. 75-68.00R.

Kaito, Yukio, to Happy Sewing Machine Manufacturing Company. Convertible-bed type sewing machine head. 4,040,369, Cl. 112-258.000.

Kakefuda, Koiti: *See*—
Shoji, Fusaji; Kokaku, Hiroyoshi; Kohkame, Hisashi; and Kakefuda, Koiti, 4,041,108, Cl. 260-881.000.

Kakiyama, Hitoo: *See*—
Yamada, Yasuhiro; Honda, Hidemasa; and Kakiyama, Hitoo, 4,040,941, Cl. 208-8.000.

Kakutani, Tsutomu: *See*—
Aboshi, Michihiro; Kakutani, Tsutomu; Yoshitake, Katsumi; and Koseki, Toshinori, 4,041,002, Cl. 260-30.60R.

Kalafus, Edward Florent; and Sharma, Satish Chander, to General Tire & Rubber Company, The. Pollution free method of making phenol formaldehyde resole tire cord dip and product. 4,040,999, Cl. 260-29.300.

Kalvelage, Gerald J. Orthodontic plier-type tool. 4,040,186, Cl. 32-66.000.

Kaman, Andrew J.: *See*—
Seeger, Nelson V.; and Kaman, Andrew J., 4,041,208, Cl. 428-424.000.

Kamei, Kazumi: *See*—
Atsukawa, Masumi; Kamei, Kazumi; Shinoda, Naoharu; and Ushio, Hiroyuki, 4,040,803, Cl. 55-73.000.

Kamezaki, Takashi: *See*—
Nakamura, Akihisa; Kamezaki, Takashi; Naito, Kenji; and Usui, Kunichika, 4,041,112, Cl. 261-72.00R.

Kamigaki, Yoshiaki: *See*—
Sunami, Hideo; Itoh, Yokichi; Inose, Fumiyuki; and Kamigaki, Yoshiaki, 4,041,521, Cl. 357-24.000.

Kamner, Haim J., to Goodman Equipment Corporation. Pull rod assembly. 4,040,308, Cl. 74-586.000.

Kampf, Julian C.; Lemke, Winfred R.; and Tucker, James T., to Square D Company. Solid state overload relay circuit. 4,041,540, Cl. 361-24.000.

Kaneko, Shinji, to Sony Corporation. Control of automatic color control and color killer circuits in video signal reproducing apparatus. 4,041,526, Cl. 358-4.000.

Kantenwein, Robert W.: *See*—
Blajda, Raymond S.; Kantenwein, Robert W.; Gaughan, Gerald E.; and Sikra, John F., 4,040,359, Cl. 102-93.000.

Kanto Denka Kogyo Co., Ltd.: *See*—
Suzuki, Akira; Orihara, Ituo; and Ishida, Akira, 4,041,235, Cl. 428-413.000.

Kapaan, Hendrikus Jan, to SKF Industries, Inc. Rolling bearing. 4,040,684, Cl. 308-187.100.

Kappler, Manfred: *See*—
Winkler, Emil; and Kappler, Manfred, 4,040,729, Cl. 351-137.000.

Karjala, Sulo A., to Wilson Foods Corporation. Keratin modifying agents and method of beneficially modifying filamentous keratin materials. 4,041,150, Cl. 424-71.000.

Karlen, Urs: *See*—
Schwander, Hansrudolf; and Karlen, Urs, 4,041,052, Cl. 260-380.000.

Karlsson, Per-Olle, to Granges Oxelosunds Jarnverk AB. Apparatus for testing metal blanks utilizing at least one inspecting head moved along the surface thereof. 4,041,379, Cl. 324-37.000.

Karsmakers, Mathijs Antonius; and Somers, Gerardus Henricus Johannus, to U.S. Philips Corporation. Pressure transducer. 4,040,297, Cl. 73-398.0AR.

Kartasuk, Raymond H.; Smierciak, Walter R.; and Hlinka, Edward A., to Wilton Corporation. Vise construction. 4,040,613, Cl. 269-247.000.

Kasahara, Yukio: *See*—
Nitta, Tsuneharu; Hayakawa, Shigeru; Kasahara, Yukio; and Terada, Ziro, 4,041,140, Cl. 423-561.00R.

Kasiwagi, Eiichi: *See*—
Makishima, Hiroshi; Hosoda, Minoru; Kasiwagi, Eiichi; and Hayashi, Toshiharu, 4,040,842, Cl. 106-1.000.

Kasper Instruments, Inc.: *See*—
Johannsmeier, Karl-Heinz, 4,040,736, Cl. 355-43.000.

Kassenaar, Teunis Adrianus: *See*—
De Bresser, Gijsbert Frederik Maria; Kassenaar, Teunis Adrianus; Verea, Ludovicus-Gerardus Johannes Godefrida; and Weenink, Leon Pieter, 4,040,706, Cl. 339-103.00R.

Kastar, Inc.: *See*—
Epstein, Harry, 4,041,380, Cl. 324-51.000.

Kasulanis, Charles Francis: *See*—
Fabian, Arthur C.; Genzer, Jerome D.; Kasulanis, Charles Francis; Shavel, John, Jr.; and Zinnes, Harold, 4,041,042, Cl. 260-301.000.

Katarao, Tadamichi, to Mitsubishi Jukogyo Kabushiki Kaisha. Chain drive for a transfer machine. 4,040,302, Cl. 74-37.000.

Kato, Shingo: *See*—
Takada, Tsutomu; Kato, Shingo; Utsunomiya, Tadashi; and Inoue, Sakae, 4,041,207, Cl. 428-421.000.

Kato, Shogo: *See*—
Kitai, Kiyoshi; Nakamura, Yukio; Kato, Shogo; and Nagaoka, Shinji, 4,041,511, Cl. 354-232.000.

Katz, Donald L.: *See*—
Cook, Harold L., Jr.; Geer, Ernest C.; and Katz, Donald L., 4,040,487, Cl. 166-314.000.

Kauber, David J.: *See*—
Westerman, David J.; McTamaney, Louis S.; and Kauber, David J., 4,041,331, Cl. 307-252.00Q.

Kawamura, Masami: *See*—
Kominami, Yasuo; Suzuki, Yukio; and Kawamura, Masami, 4,041,409, Cl. 330-29.000.

Kawasaki, Masahiro; and Ando, Hirokazu, to Asahi Kogaku Kogyo Kabushiki Kaisha. Timing circuits for camera shutters. 4,041,506, Cl. 354-51.000.

Kawasaki Steel Corporation: *See*—
Akahide, Kozo; and Agusa, Kazuo, 4,041,270, Cl. 219-73.00R.

Keene, Henry Rich: *See*—
Atkins, Frederick Joseph; and Keene, Henry Rich, 4,040,375, Cl. 114-160.000.

Kelch, David J.: *See*—
Kraus, Walter R.; Kelch, David J.; and Jensen, Gerald A., 4,040,928, Cl. 204-195.00M.

Kelch, George W., to United Technologies Corporation. Apparatus and method for removing a plurality of blade dies. 4,040,161, Cl. 29-239.000.

Keller, Wilbur S., to Dresser Industries, Inc. Rock bit having a ball bearing raceway with anti-galling material. 4,040,680, Cl. 308-8.200.

Kelley, Arnold E.; Reeg, Cloyd P.; Wood, Frederick C.; and Cheadle, George D., to Union Oil Company of California. Manufacture of catalytic cracking charge stocks by hydrocracking. 4,040,944, Cl. 208-89.000.

Kellner, Jackson M., to Smith International, Inc. Drill director. 4,040,494, Cl. 175-45.000.

Kellner, Jackson M.; and Garrett, William R., to Smith International, Inc. Drilling apparatus. 4,040,495, Cl. 175-73.000.

Kelly, James G.: *See*—
Ashworth, James G.; Glock, Eugene; Kelly, James G.; McLaughlin, James L.; and Merwin, Owen T., 4,040,431, Cl. 131-140.00P.

Kelly, John. Commodities board game apparatus. 4,040,629, Cl. 273-135.00C.

Kelly, Susan J.; and Butler, Larry G., to Purdue Research Foundation. Phosphonate monoesters and method of preparation. 4,041,111, Cl. 260-954.000.

Kelz, Norbert R. Pressure moulding machines and mould parts therefor. 4,040,776, Cl. 425-145.000.

Kendall Company, The: *See*—
Collins, Robert F., 4,040,418, Cl. 128-132.00D.
Libman, Gary; and Villari, Frank K., 4,040,909, Cl. 195-127.000.
Winnie, Alon P., 4,040,427, Cl. 128-348.000.
Zoephel, Richard L., 4,040,124, Cl. 2-51.000.

Keneman, Scott Allen: *See*—
Catanese, Carmen Anthony; and Keneman, Scott Allen, 4,041,342, Cl. 313-105.00R.

Kennecott Copper Corporation: *See*—
Marshall, David W.; MCGrath, Kenneth W.; O'Day, William R., Jr.; and Wilder, Thomas C., 4,040,942, Cl. 204-13.000.

Kennedy, Kenneth B. Process for purifying hydrocarbon gas streams. 4,040,806, Cl. 62-28.000.

Kenworthy, John B., to Hay Handling Equipment Company. Baled hay loading and transport device. 4,040,534, Cl. 214-766.000.

Keogh, Gerard G., Jr.: *See*—
Keogh, Gerard G., Sr.; and Keogh, Gerard G., Jr., 4,040,381, Cl. 116-86.000.

Keogh, Gerard G., Sr.; and Keogh, Gerard G., Jr. Visual burglar alarm. 4,040,381, Cl. 116-86.000.

Kermer, Wolf-Dieter: *See*—
Maier, Karl; Hansen, Guenter; and Kermer, Wolf-Dieter, 4,041,025, Cl. 260-158.000.

Kern, Frederick William, to Eastman Kodak Company. Indicating device for photographic apparatus. 4,041,510, Cl. 354-217.000.

Keseleski, Adam J.: *See*—
Sipos, Frank; and Keseleski, Adam J., 4,041,232, Cl. 536-17.000.

Kesselring, Horst: *See*—
Johne, Hans; Jentzsch, Arndt; Schumann, Gunter; Reichenberger, Roland; Kesselring, Horst; and Fischer, Karl-Heinz, 4,040,347, Cl. 101-349.000.

Kestian, Anthony M.; and Allori, Raymond J., to International Harvester Company. Vehicle control armrest in a vibration isolated control module. 4,040,499, Cl. 180-77.00R.

Ketchpel, Richard D., to Rockwell International Corporation. Transflector. 4,040,727, Cl. 350-288.000.

Khodorov, Alexandr Iosifovich: *See*—
Makeev, Boris Anatolievich; Stepochkin, Lev Mikhailovich; Korot, Garri Moiseevich; Batozsky, Vadim Ivanovich; Khodorov, Alexandr Iosifovich; Zhuravlev, Vitaly Ivanovich; and Eremenko, Adolf Grigorievich, 4,040,318, Cl. 83-71.000.

Kiejzik, Paul A. Film trimming device. 4,040,317, Cl. 83-56.000.

Kiele, Francis S.: *See*—
Hessel, Harold H.; and Kiele, Francis S., 4,040,515, Cl. 206-.500.

Kiener, Karl. Internal combustion process and engine. 4,040,400, Cl. 123-68.000.

Kihlberg, Gunnar Axel, to Jungner Instrument AB. Method of measuring the velocity of an object relative to a reference and a device for effecting said method. 4,041,293, Cl. 235-151.320.

Kikuchi, Kenji: *See*—
Uchio, Ryosuke; Kikuchi, Kenji; Asai, Soichiro; and Yarita, Kenichi, 4,040,906, Cl. 195-36.00R.

Kikuchi, Mitsuo; and Hiraga, Yoichi, to Toyo Soda Manufacturing Co., Ltd. Process for removing sulfate ions from extracted phosphoric acid employing barium compounds and activated carbon. 4,041,134, Cl. 423-321.00S.

Kikuchi, Yasuo; Ohmichi, Yasuyuki; Terasaki, Osamu; and Sakai, Koichi, to Sony Corporation. Deflection yoke for use with in-line cathode ray tubes. 4,041,428, Cl. 335-210.000.

Kikumoto, Ryoji: *See*—
Okamoto, Shosuke; Kikumoto, Ryoji; Ohkubo, Kazuo; Tezuka, Tohru; Tonomura, Shinji; Tamao, Yoshikuni; and Hijikata, Akiko, 4,041,156, Cl. 424-177.000.

Kilbourne, Bernard: *See*—
Jepson, Michael John; and Kilbourne, Bernard, 4,040,167, Cl. 29-564.400.

Kim Lighting, Inc.: *See*—
Compton, Wayne W.; and Draper, Robert Paul, 4,041,306, Cl. 240-103.00R.

Kim, Young Ran; Ornstein, Leonard; and Waters, Henry Cook, III, to

Technicon Instruments Corporation. Lysable blood preservative composition. 4,040,785, Cl. 23-230.00B.
Kimberly-Clark Corporation: *See—*
Brock, Robert J.; and Meitner, Gary H., 4,041,203, Cl. 428-157.000.
Kimmel, Richard James: *See—*
Hill, Max Lee; and Kimmel, Richard James, 4,040,654, Cl. 296-57.00R.
Kimura, Ichiro: *See—*
Matsuda, Yasumasa; Kimura, Ichiro; Sagawa, Akio; and Hiramatsu, Tsutomu, 4,040,294, Cl. 73-117.300.
Kimura, Osamu, to Tomy Kogyo Co., Inc. Base and rotatably mounted doll with relatively movable part. 4,040,206, Cl. 46-138.000.
Kindell, Jerry L., to Honeywell Information Systems Inc. High speed binary multiplication system employing a plurality of multiple generator circuits. 4,041,292, Cl. 235-164.000.
King, Charles W.; Ruff, Donald O.; and Sheldrake, Leonard J., to General Motors Corporation. Storage battery charging system fault indicating circuit. 4,041,369, Cl. 322-99.000.
King, Frank D.: *See—*
Jorgensen, George N.; King, Frank D.; and Butler, DeForest D., 4,040,755, Cl. 403-205.000.
King, Marguerite. Shoulder strap retainer. 4,040,147, Cl. 24-86.00A.
King, Terance M.: *See—*
Pearne, Frank S.; Pearne, Florentin J.; Osborn, William P.; King, Terance M.; and Guzzetta, Joseph A., 4,040,532, Cl. 214-152.000.
Kingsford Company, The: *See—*
Vincent, George C.; and Rauch, David, 4,040,796, Cl. 44-14.000.
Kinkead, Robin D.: *See—*
Cota, Dan E.; Charter, Ted R.; Beeson, Robert M.; and Kinkead, Robin D., 4,041,467, Cl. 364-900.000.
Kinney, Bruce W., Jr.: *See—*
Spence, John R.; and Kinney, Bruce W., Jr., 4,041,330, Cl. 307-251.000.
Kinney, Ohler L., Jr., to Marley Company, The. Dual path drift eliminator structure and method for crossflow cooling tower. 4,040,824, Cl. 55-257.00R.
Kirby, Harold R.: *See—*
Loach, James A.; and Kirby, Harold R., 4,040,820, Cl. 75-68.00R.
Kirkland, Joe D., Jr., to Taylor, Steve, a part interest. Method and apparatus for air development and rejuvenation of water wells. 4,040,486, Cl. 166-311.000.
Kishi, Yoshio, to Sony Corporation. Tape cassette with locking sensor slide. 4,041,537, Cl. 360-60.000.
Kishida, Kazuo: *See—*
Ide, Fumio; Kishida, Kazuo; and Osaka, Norihisa, 4,041,106, Cl. 260-876.00R.
Kitagawa, Toru: *See—*
Watanabe, Haruo; Kitagawa, Toru; Negishi, Masaaki; Aonuki, Kiichi; and Kobayashi, Harunobu, 4,041,059, Cl. 260-424.000.
Kitai, Kiyoshi; Nakamura, Yukio; Kato, Shogo; and Nagaoka, Shinji, to Seiko Koki Kabushiki Kaisha. Driving device of lens shutter of single-lens reflex camera. 4,041,511, Cl. 354-232.000.
Kitamura, Koji, to Tokai Denka Kogyo Kabushiki Kaisha. Method of treating surface of copper and its alloys. 4,040,863, Cl. 134-3.000.
Kitamura, Nobuo; Takada, Katsuo; and Fukagawa, Hiroshi, to Sony Corporation. Channel indicating apparatus. 4,041,401, Cl. 325-455.000.
Kitaura, Hiromu: *See—*
Yamamoto, Katsuhiko; Hontani, Kunihiko; Kitaura, Hiromu; and Nakamura, Michio, 4,041,533, Cl. 358-160.000.
Klauke, Erich: *See—*
Sirrenberg, Wilhelm; Schramm, Jurgen; Klauke, Erich; Hammann, Ingeborg; and Stendel, Wilhelm, 4,041,177, Cl. 424-322.000.
Kleeberg, Wolfgang: *See—*
Rubner, Roland; Kleeberg, Wolfgang; and Kuhn, Eberhard, 4,040,831, Cl. 96-35.100.
Kleiner, Hans-Jerg: *See—*
Huber, Bernd; and Kleiner, Hans-Jerg, 4,041,230, Cl. 526-278.000.
Kleinert, Bernard L. Beer case and soft drink carton carrier strap. 4,040,550, Cl. 224-45.00P.
Kline, Gregory G. Synthetic material drumstick. 4,040,323, Cl. 84-422.00S.
Klingler, Josef F. Magnifying display article. 4,040,724, Cl. 350-239.000.
Klipec, Bruce E.: *See—*
Stine, Clifford R.; Klipec, Bruce E.; and Herbert, William J., 4,041,237, Cl. 174-36.000.
Knapp, Heinrich, to Robert Bosch GmbH. Electro-magnetic fuel injection valve. 4,040,569, Cl. 239-467.000.
Knapp, Kenneth K.; and Koch, William E., to Eaton Corporation. Hydrostatic transmission with automatic displacement shifter. 4,040,254, Cl. 60-420.000.
Knappstein, Johannes; and Stratmann, Josef, to Carl Still, Firma. Apparatus for charging coke ovens. 4,040,910, Cl. 202-262.000.
Kneitel, Dieter: *See—*
Roebke, Wolfgang; Kneitel, Dieter; and Parr, Erfried, 4,040,972, Cl. 252-179.000.
Knight, James, to Lawrence Peska Associates. Intrusion alarm-ignition control system for a motor vehicle. 4,041,450, Cl. 340-64.000.
Knop, Klaus: *See—*
Altenhoner, Klaus; Jansen, Walter; Knop, Klaus; Pohl, Ulrich; and Reerink, Jan G., 4,040,816, Cl. 75-35.000.
Ko, Norman Wah Man: *See—*
Chan, Kwok Yan; and Ko, Norman Wah Man, 4,041,507, Cl. 354-64.000.
Kobashi, Kiyoshi: *See—*
Nohira, Hidetaka; Kobashi, Kiyoshi; and Tanaka, Masaaki, 4,040,402, Cl. 123-119.00A.
Kobayashi, Harunobu: *See—*
Watanabe, Haruo; Kitagawa, Toru; Negishi, Masaaki; Aonuki, Kiichi; and Kobayashi, Harunobu, 4,041,059, Cl. 260-424.000.
Kobayashi, Nobuyuki: *See—*
Hayashi, Kiyoshige; Nakaniwa, Mikio; Kobayashi, Nobuyuki; Yamamoto, Minoru; and Hase, Yoshihiko, 4,040,946, Cl. 208-131.000.
Koboshi, Sigeharu: *See—*
Sakamoto, Kenro; Fushiki, Isamu; and Koboshi, Sigeharu, 4,040,837, Cl. 96-60.0BF.
Koch, Herbert Joachim. Sound-slide projector control apparatus. 4,041,457, Cl. 340-147.0MD.
Koch, William E.: *See—*
Knapp, Kenneth K.; and Koch, William E., 4,040,254, Cl. 60-420.000.
Kochetkova, Anna Georgievna: *See—*
Polukhina, Ljudmila Alexeevna; Polukhin, Vladimir Nikolaevich; and Kochetkova, Anna Georgievna, 4,041,375, Cl. 324-32.000.
Kocis, Thomas Robert: *See—*
Smith, Jessop; and Kocis, Thomas Robert, 4,040,196, Cl. 42-23.000.
Kocsis, Karoly; Peter, Heinrich; and Bickel, Hans, to Ciba-Geigy Corporation. Cephalosporins having an α-acylaminoacetic acid side chain. 4,041,161, Cl. 424-246.000.
Koddebusch, Hubert: *See—*
Metzner, Wolfgang; and Koddebusch, Hubert, 4,041,176, Cl. 424-318.000.
Koegel, Ralph A., to Bunker Ramo Corporation. Sinkler cam segment. 4,040,276, Cl. 66-107.000.
Koehring: *See—*
Wilke, Raud A., 4,040,438, Cl. 137-106.000.
Koeth, Helmut, to Siemens Aktiengesellschaft. Equalizer for partial response signals. 4,041,418, Cl. 333-18.000.
Kohjin Co., Ltd.: *See—*
Obara, Isao; and Yagami, Kazuo, 4,041,144, Cl. 423-618.000.
Kohkame, Hisashi: *See—*
Shoji, Fusaji; Kokaku, Hiroyoshi; Kohkame, Hisashi; and Kakefuda, Koiti, 4,041,108, Cl. 260-881.000.
Kohlen, Rudolf: *See—*
Rudolph, Paul; Bierbach, Herbert; Kupfer, Hans; Hafke, Carl; and Kohlen, Rudolf, 4,040,800, Cl. 48-85.200.
Kohlheb, Robert, to Supraton Aurer & Zucker OHG, Firma. Rotary filter separator. 4,040,965, Cl. 210-297.000.
Kokaku, Hiroyoshi: *See—*
Shoji, Fusaji; Kokaku, Hiroyoshi; Kohkame, Hisashi; and Kakefuda, Koiti, 4,041,108, Cl. 260-881.000.
Kokubo, Eiichi: *See—*
Uchida, Isamu; Kokubo, Eiichi; and Yoshida, Minoru, 4,041,282, Cl. 235-98.00R.
Kolell, Norbert C.; and Conners, John P., to Giddings & Lewis, Inc. Final servo control in NC systems. 4,041,287, Cl. 235-151.110.
Koljonen, Vilho, to General Motors Corporation. Dual color taillamp. 4,041,302, Cl. 240-8.300.
Koller, Stefan: *See—*
Loew, Peter; Defago, Raymond; and Koller, Stefan, 4,040,779, Cl. 8-2.50R.
Kominami, Yasuo; Suzuki, Yukio; and Kawamura, Masami, to Hitachi, Ltd. Automatic gain control circuit. 4,041,409, Cl. 330-29.000.
Kommanditbolaget Pemac Invention AB & Co.: *See—*
Goransson, Per Staffan, 4,040,212, Cl. 52-145.000.
Komoda, Tsutomu: *See—*
Todokoro, Hideo; and Komoda, Tsutomu, 4,041,316, Cl. 250-396.00R.
Kondo, Toshihiro, to Kondo, Toshihiro; and Fuji Photo Film Co., Ltd. Shutter for photographic cameras. 4,041,513, Cl. 354-241.000.
Konig, Justus; and Rohrig, Josef, to Siemens Aktiengesellschaft. Switching arrangement for telecommunication switching systems. 4,041,245, Cl. 179-18.0AB.
Konishiroku Photo Industry Co., Ltd.: *See—*
Sakamoto, Kenro; Fushiki, Isamu; and Koboshi, Sigeharu, 4,040,837, Cl. 96-60.0BF.
Konnemann, Alfred, to Grote & Hartmann. Double spring contact and method of making the same. 4,040,713, Cl. 339-259.00R.
Kopaska, Arnold F.: *See—*
Wurdeman, Marion E.; Wurdeman, James E.; and Kopaska, Arnold F., 4,040,529, Cl. 214-17.0CB.
Korenhof, Abraham, to SKF Industrial Trading and Development Company B.V. Hub bearing unit. 4,040,683, Cl. 308-187.100.
Korfund Dynamics Corporation: *See—*
Baratoff, Paul, 4,040,590, Cl. 248-358.0AA.
Kormanyos, Kenneth R.; McCollister, Howard L.; and White, Paul L., to Owens-Illinois, Inc. Method for forming solid electrolyte composite. 4,041,215, Cl. 429-104.000.
Korot, Garri Moiseevich: *See—*
Makeev, Boris Anatolievich; Stepochkin, Lev Mikhailovich; Korot, Garri Moiseevich; Batozsky, Vadim Ivanovich; Khodorov, Alexandr Iosifovich; Zhuravlev, Vitaly Ivanovich; and Eremenko, Adolf Grigorievich, 4,040,318, Cl. 83-71.000.
Koseki, Toshinori: *See—*
Aboshi, Michihiro; Kakutani, Tsutomu; Yoshitake, Katsumi; and Koseki, Toshinori, 4,041,002, Cl. 260-30.60R.
Kostenbauer, Ronald F.: *See—*
Slutzky, Joel; Hausman, LeeRoy W., Jr.; and Kostenbauer, Ronald F., 4,041,463, Cl. 364-900.000.

Koster, Marinus Pieter, to U.S. Philips Corporation. Worm gear transmission. 4,040,307, Cl. 74-425.000.

Kosuda, Tooru: *See*—
Tanaka, Eizi; Mochizuki, Hiroshi; Kosuda, Tooru; Abe, Seikou; and Ohashi, Michihiro, 4,040,405, Cl. 123-139.0BG.

Kotansky, Stephen: *See*—
Coppola, Patrick S.; and Kotansky, Stephen, 4,040,600, Cl. 251-63.000.

Kotelnikov, Grigory Vladimirovich; and Krylov, Gennady Petrovich. Differential microcalorimeter. 4,040,288, Cl. 73-15.00B.

Kouchich, Allan; and Taylor, George W., to Allen-Bradley Company. Cermet varistors. 4,041,436, Cl. 338-21.000.

Kozacka, Frederick J., to Chase-Shawmut Company, The. Electric fuse and process of manufacturing the same. 4,041,525, Cl. 337-295.000.

Kozuka, Hajime: *See*—
Yoshida, Hiroshi; Kozuka, Hajime; Sakano, Toyoshi; Honda, Yoichiro; and Omuro, Shojiro, 4,040,502, Cl. 180-149.000.

Kramer, Pieter; Compaan, Klaas; and Forsthuber, Robert Franz Karl, to U.S. Philips Corporation. Video disc with phase structure. 4,041,530, Cl. 358-128.000.

Kratz, Gary L.; Sproul, William W., III; Walendziewicz, Eugene T.; Wallis, Donald E.; and Dennis, Charles A., to International Business Machines Corporation. Signal analyzer system. 4,041,461, Cl. 364-200.000.

Kraus, Bernd; and Glockler, Otto, to Robert Bosch GmbH. System for reducing toxic components in the exhaust gas of an internal combustion engine. 4,040,408, Cl. 123-179.00L.

Kraus, Walter R.; Kelch, David J.; and Jensen, Gerald A., to Mead Corporation, The. Specific ion sensor and method of manufacture. 4,040,928, Cl. 204-195.00M.

Krauss, Ronald C. Wind power accessory for a vehicle wheel. 4,040,582, Cl. 244-103.00S.

Krenzer, John, to Velsicol Chemical Corporation. Herbicidal carbonates and thiocarbonates of thiadiazolyl-2(1H)-pyrimidinones. 4,040,812, Cl. 71-90.000.

Krieg, Walter, to Digitron AG. Installation for manufacturing motor vehicles or other products comprising a number of component elements. 4,040,527, Cl. 214-16.40A.

Krossa, Kenneth D.; and Earl, Douglas B., to Scientific Micro Systems, Inc. Data processing system including a plurality of programmed machines and particularly including a supervisor machine and an object machine. 4,041,471, Cl. 364-200.000.

Krueger, Friedrich; and Schmidt, Guenter, to Joh. A. Benckiser GmbH. Monophosphoric acid esters of hydroxy alkyl urea compounds. 4,041,110, Cl. 260-938.000.

Krylov, Gennady Petrovich: *See*—
Kotelnikov, Grigory Vladimirovich; and Krylov, Gennady Petrovich, 4,040,288, Cl. 73-15.00B.

Kubokura, Kuniaki: *See*—
Sunada, Masayoshi; and Kubokura, Kuniaki, 4,040,508, Cl. 192-12.00D.

Kubota, Ltd.: *See*—
Okada, Yoshitsugu; Nanao, Teruaki; and Sugino, Toshio, 4,040,443, Cl. 137-546.000.

Kuhn, Burt L., to AKDOV Animal Health Care Products, Inc. Animal medication dispenser. 4,040,422, Cl. 128-223.000.

Kuhn, Eberhard: *See*—
Rubner, Roland; Kleeberg, Wolfgang; and Kuhn, Eberhard, 4,040,831, Cl. 96-35.100.

Kuhn, Robert R.; and Machleder, Warren H., to Rohm and Haas Company. Hydrocarbon compositions containing rust inhibitors. 4,040,798, Cl. 44-71.000.

Kuipers, Franciscus Antonius: *See*—
van den Enden, Adrianus Wilhelmus Maria; Kuipers, Franciscus Antonius; de Niet, Edmond; and Druyvesteyn, Willem Frederik, 4,041,478, Cl. 340-174.0TF.

Kulikowski, Donald F.: *See*—
Ostrem, Obert M.; Kulikowski, Donald F.; and Pulciani, Sam C., 4,040,540, Cl. 220-273.000.

Kulisch, Ruth. Air bubbling massaging apparatus. 4,040,415, Cl. 128-66.000.

Kulite Semiconductor Products, Inc.: *See*—
Brosh, Amnon; and Geiger, Dana F., 4,041,289, Cl. 235-151.330.
Kurtz, Anthony D.; and Mallon, Joseph R., 4,040,172, Cl. 29-580.000.

Kullmann, Rolf; and Pfeil, Erhard, to DEMAG Aktiengesellschaft. Metal smelting plant with treatment stand to regulate the analysis of metal smelts, particularly for desulphurization of liquid crude iron or liquid unrefined steel. 4,040,609, Cl. 266-143.000.

Kuntz, David H. Specimen collecting device. 4,040,791, Cl. 23-259.

Kuo, James C.; Prater, Charles Dwight; and Wise, John J., to Mobil Oil Corporation. Method for upgrading products of Fischer-Tropsch synthesis. 4,041,094, Cl. 260-676.00R.

Kuo, James C., to Mobil Oil Corporation. Method for upgrading C_3 plus product of Fischer-Tropsch Synthesis. 4,041,095, Cl. 260-676.00R.

Kuo, James C., to Mobil Oil Corporation. Method for upgrading C_3 plus product of Fischer-Tropsch Synthesis. 4,041,096, Cl. 260-676.00R.

Kupec, Jiri; and Hrdlicka, Renor, to Tesla, narodni podnik. Circuit system for adjusting the input of a connected-up logic circuit. 4,041,384, Cl. 324-73.0PC.

Kupfer, Hans: *See*—
Rudolph, Paul; Bierbach, Herbert; Kupfer, Hans; Hafke, Carl; and Kohlen, Rudolf, 4,040,800, Cl. 48-85.200.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See*—
Ohtsuka, Takaaki; Satake, Keigo; Yamazaki, Shiro; Hatakeyama, Nobuo; and Watanabe, Takeo, 4,041,170, Cl. 424-277.000.

Kurita, Masakatsu, to Omron Tateisi Electronics Co. Driver circuit for liquid crystal display. 4,040,721, Cl. 350-160.0LC.

Kurosaki, Takefumi, to Rank Xerox Ltd. Original discharging device for copiers. 4,040,615, Cl. 271-63.000.

Kurtz, Anthony D.; and Mallon, Joseph R., to Kulite Semiconductor Products, Inc. Method of manufacturing integral transducer assemblies employing built-in pressure limiting. 4,040,172, Cl. 29-580.000.

Kurz, Herbert: *See*—
Tax, Hans; and Kurz, Herbert, 4,040,667, Cl. 299-8.000.

Kydd, Paul H.: *See*—
Darrow, Kenneth A.; Kydd, Paul H.; and Daly, John W., 4,040,159, Cl. 29-156.80H.

Kyle, James C.: *See*—
Bosche, Earl E.; Havlik, Jay M.; and Kyle, James C., 4,040,256, Cl. 61-15.000.

Kyorin Pharmaceutical Co., Ltd.: *See*—
Irikura, Tsutomu, 4,041,038, Cl. 260-268.00C.

Kyri, Hans; Brandle, Karl; Muller, Martin; and Heine, Heinrich, to Bayer Aktiengesellschaft. Production of porous gypsum moldings. 4,040,850, Cl. 106-87.000.

La Coste and Romberg, Inc.: *See*—
LaCoste, Lucien J. B., 4,040,189, Cl. 33-304.000.

La Telemecanique Electrique: *See*—
Lascarrou, Alain, 4,040,694, Cl. 312-263.000.

Laborde, Joseph N., to Ethyl Corporation. Framing system. 4,040,231, Cl. 52-664.000.

LaBranche, Harvey W., to Western Plastics Corporation. Self-locking pipe coupling. 4,040,651, Cl. 285-113.000.

LaCoste, Lucien J. B., to La Coste and Romberg, Inc. Method and apparatus for leveling an instrument in a well bore. 4,040,189, Cl. 33-304.000.

Lacroix, Jean R. Automatic apparatus for making rolled cigarettes. 4,040,429, Cl. 131-51.000.

Laesser, Claude, to Ebauches S.A. Alarm electric watch. 4,040,248, Cl. 58-38.00R.

LaGiusa, Frank F., to General Electric Company. Ellipsoidal reflector lamp. 4,041,344, Cl. 313-113.000.

Lamb Industries, Inc.: *See*—
Lamb, William C.; and Wetzel, Rodney J., 4,040,524, Cl. 214-2.500.

Lamb, William C.; and Wetzel, Rodney J., to Lamb Industries, Inc. Apparatus for handling pipe at well site. 4,040,524, Cl. 214-2.500.

Lamberti, Vincent; and Pease, Wilder F., to Lever Brothers Company. Novel 2-(alkylsulfinyl)ethyl sulfates and compositions employing same. 4,040,781, Cl. 8-137.000.

Lampe, Donald R.; and White, Marvin H., to Westinghouse Electric Corporation. Floating clock sensor for buffered, independent, nondestructive readout of charge transfer devices. 4,041,298, Cl. 235-193.000.

Lancaster, William R. Self-fertilizing pot. 4,040,207, Cl. 47-80.000.

Lancini, Giancarlo: *See*—
Assandri, Alessandro; Lancini, Giancarlo; Volpe, Giancarlo; and Cavalleri, Bruno, 4,041,168, Cl. 424-273.000.

Land, Edgel T. Low cost storm window. 4,040,210, Cl. 52-2.000.

Landeroin Duvernois, Odette. Electric heating device. 4,041,438, Cl. 338-237.000.

Landi, James V. Squeeze toy and exercising device. 4,040,619, Cl. 272-68.000.

Lange, Frederick F.; and Terwilliger, Gerald R., to Westinghouse Electric Corporation. Method of compacting shaped powdered objects. 4,041,123, Cl. 264-332.000.

Langebach, Hans Peter: *See*—
Frank, Horst; and Langebach, Hans Peter, 4,040,266, Cl. 62-121.000.

Langlie, Howard; and Berg, Albert T., Jr. Gate handle for an electric fence. 4,040,604, Cl. 256-10.000.

Lapp, Roger H., to United States of America, Navy. Line scan radar antenna using a single motor. 4,041,500, Cl. 343-761.000.

Larkin, William A., to M&T Chemicals Inc. Melt viscosity stabilizers for vinyl chloride polymers. 4,041,015, Cl. 260-45.75R.

Lars Collin Consult AB: *See*—
Collin, Lars Th., 4,040,783, Cl. 23-232 R.

LaSalle Steel Company: *See*—
Mudiare, Edeki, 4,040,872, Cl. 148-12.00B.

Lascarrou, Alain, to La Telemecanique Electrique. Framework for metal cabinet. 4,040,694, Cl. 312-263.000.

Lasier, Thomas R.; Rodseth, William G.; and Schnarr, Raymond H., to Schlage Lock Company. Releasable door hold-open device. 4,040,143, Cl. 16-48.00J.

Lasier, Thomas R.; and Schnarr, Raymond H., to Schlage Lock Company. Door assister. 4,040,144, Cl. 16-66.000.

Lattner, Elmer A., to PPG Industries, Inc. Apparatus for scrubbing stain into sheet or board material. 4,040,384, Cl. 118-120.000.

Latty, James A.: *See*—
Fong, Ronald A.; Latty, James A.; and McDonnell, Roger P., 4,041,006, Cl. 260-33.6UA.

Laure, George R., to Laure Prosthetics, Inc. Wrist joint prosthesis. 4,040,130, Cl. 3-1.910.

Laure Prosthetics, Inc.: *See*—
Laure, George R., 4,040,130, Cl. 3-1.910.

Laurel Bank Machine Co., Ltd.: *See*—
Ohsako, Kyoichi; and Yamashita, Katusuke, 4,041,280, Cl. 235-92.0CN.
Uchida, Isamu; Kokubo, Eiichi; and Yoshida, Minoru, 4,041,282, Cl. 235-98.00R.
Watanabe, Kenkichi; and Ohsako, Kyoichi, 4,040,434, Cl. 133-1.00A.

Lavanchy, Jean-Pierre: *See—*
Handtmann, Dieter; and Lavanchy, Jean-Pierre, 4,040,740, Cl. 356-4.000.
Lawrence Peska Associates: *See—*
Knight, James, 4,041,450, Cl. 340-64.000.
Layton, Beryl W.: *See—*
Ophaug, Darrell P.; and Layton, Beryl W., 4,041,423, Cl. 335-20.000.
Lazennec, Yvon: *See—*
Desplanches, Gerard; Lazennec, Yvon; and Wicker, Alain, 4,041,216, Cl. 429-104.000.
Leach, Paul A., to Jaffrey Fire Protection Company, Inc. Line relay valve. 4,040,771, Cl. 417-62.000.
Lebedeva, Valentina Ivanovna: *See—*
Smirnov, Viktor Sergeevich; Gryaznov, Vladimir Mikhailovich; Lebedeva, Valentina Ivanovna; Mischenko, Alexandr Petrovich; Polyakova, Victoria Petrovna; and Savitsky, Evgeny Mikhailovich, 4,041,093, Cl. 260-673.500.
Le Can, Claude Jan Principe Frederik, to U.S. Philips Corporation. Memory matrix controller. 4,041,474, Cl. 340-173.00R.
Lech, Joseph: *See—*
McNeill, William H.; Haugsjaa, Paul O.; Lech, Joseph; and Regan, Robert J., 4,041,352, Cl. 315-248.000.
Leclerc, Pierre; and Dubois, Jean Claude. Resins for use as electron resists. 4,041,191, Cl. 427-43.000.
Lee, Char-Shin; and Wang, Hsug-Fang. Gearless pressure or temperature gauge. 4,040,298, Cl. 73-406.000.
Lee, Robert Wayne. Pull cord righting portable target. 4,040,624, Cl. 273-102.0AP.
Leedom, Marvin Allan, to RCA Corporation. Overhead disc record grounding apparatus. 4,040,634, Cl. 274-2.000.
Leedom, Marvin Allan, to RCA Corporation. Releasable stylus arm magnetic coupling. 4,040,635, Cl. 274-37.000.
Leeds & Northrup Company: *See—*
Lewis, Ronald Cyril, Jr., 4,041,404, Cl. 328-150.000.
Lefebvre, Michel Serge, to OPI Metriservice, Societe Anonyme. Process for coloring surfaces. 4,040,353, Cl. 101-426.000.
LeGrand, Donald G.; and Vitale, Gina G., to General Electric Company. Primer composition, composite and method for making the same. 4,040,882, Cl. 156-106.000.
Leichle, Claude, to Regie Nationale des Usines Renault; and Automobiles Peugeot. Control of electromagnetic fuel injectors in internal combustion engines. 4,040,397, Cl. 123-32.0AE.
Leifheit International Gunter Leifheit GmbH: *See—*
Liebscher, Johannes, 4,040,138, Cl. 15-42.000.
Liebscher, Johannes; and Schulein, Rolf G., 4,040,546, Cl. 223-88.000.
Leisure, Everett R., to Esco Corporation. Mounting for sectional screen. 4,040,901, Cl. 162-251.000.
Lemke, Winfred R.: *See—*
Kampf, Julian C.; Lemke, Winfred R.; and Tucker, James T., 4,041,540, Cl. 361-24.000.
Lemons, Kyle Eugene: *See—*
Blish, Richard C., II; and Lemons, Kyle Eugene, 4,040,897, Cl. 156-656.000.
Lennox Industries, Inc.: *See—*
Pfarrer, David M.; and Parker, Sidney A., 4,041,542, Cl. 361-27.000.
Leopold, Kurt: *See—*
Richardson, Martin C.; and Leopold, Kurt, 4,041,414, Cl. 331-94.50G.
Leroy, Pierre; and Sprunck, Emile. Device for clamping the base plate of a steel refining converter. 4,040,611, Cl. 266-243.000.
Leroy, Pierre; and Sprunck, Emile. Blast pipe assembly for the bottom plate of a converter or furnace for refining metals. 4,040,612, Cl. 266-268.000.
Letot, Incorporated: *See—*
Churchill, Steven T., 4,041,242, Cl. 179-2.00A.
Lever Brothers Company: *See—*
Cottier, Derek; and Rossell, John Barry, 4,041,188, Cl. 426-607.000.
Lamberti, Vincent; and Pease, Wilder F., 4,040,781, Cl. 8-137.000.
Levin, Howard J.: *See—*
Fenichel, Richard L.; and Levin, Howard J., 4,041,155, Cl. 424-177.000.
Lewals, Inc.: *See—*
Walls, Leroy C., 4,040,513, Cl. 198-530.000.
Lewis, Bernard L., to United States of America, Navy. Sea clutter reduction technique. 4,041,489, Cl. 343-17.10R.
Lewis, Deanna Rose: *See—*
Grossman, Milton J.; and Lewis, Deanna Rose, 4,040,560, Cl. 229-41.00B.
Lewis, Morton; and Rohrer, John F., to Unitech Chemical Inc. Cured epoxy resins. 4,040,994, Cl. 260-18.0PF.
Lewis, Ronald Cyril, Jr., to Leeds & Northrup Company. Apparatus and method for detecting when a measured variable represented by a string of digital pulses reaches a plateau. 4,041,404, Cl. 328-150.000.
Lewis, Terence John; Brooks, Raymond; and Selby, John, to Torrington Company Limited, The. Cutting or grinding tool protecting guard. 4,040,336, Cl. 90-11.00R.
Li, Tao P., to Monsanto Company. Production of (amm)oxidation catalyst. 4,040,978, Cl. 252-437.000.
Liao, Paul Foo-Hung: *See—*
Bjorklund, Gary Carl; and Liao, Paul Foo-Hung, 4,040,718, Cl. 350-147.000.
Libman, Gary; and Villari, Frank K., to Kendall Company, The. Diagnostic device for a liquid sample. 4,040,909, Cl. 195-127.000.
Libowitz, George G., to Allied Chemical Corporation. Thermal energy storage systems employing metal hydrides. 4,040,410, Cl. 126-270.000.
Liebermann, Leonard N., to United States of America, Navy. Capacitive-type displacement and pressure sensitive transducer. 4,041,446, Cl. 340-17.00R.
Liebig, Hans-Peter: *See—*
Ahaus, Gerhard; Netzer, Siegfried; and Liebig, Hans-Peter, 4,040,673, Cl. 303-6.00C.
Liebman, Arnold Alvin: *See—*
Felix, Arthur Martin; and Liebman, Arnold Alvin, 4,041,023, Cl. 260-112.50R.
Liebowitz, Marvin: *See—*
Compa, Russell Edward; Liebowitz, Marvin; and Messina, Ralph Paul, 4,041,205, Cl. 428-220.000.
Liebscher, Johannes, to Leifheit International Gunter Leifheit GmbH. Drive for use in a sweeping device. 4,040,138, Cl. 15-42.000.
Liebscher, Johannes; and Schulein, Rolf G., to Leifheit International Gunter Leifheit GmbH. Hollow plastic garment hanger. 4,040,546, Cl. 223-88.000.
Lietar, Christian, to Robert Bosch GmbH. Optical congruence comparator. 4,040,746, Cl. 356-168.000.
Light, Kenneth K.; Shuster, Edward J.; Vinals, Joaquin F.; and Vock, Manfred Hugo, to International Flavors & Fragrances Inc. Tricyclic alcohols. 4,041,084, Cl. 260-617.00F.
Linard, Robert Housu. Measuring apparatus. 4,041,321, Cl. 250-560.000.
Lindberg, Steven E.; Marchant, Kerford A., Jr.; and Van Strien, Richard E., to Standard Oil Company (Indiana). Polyamide-imides prepared from 4-carboxy-phthalimide aliphatic carboxylic acids. 4,041,065, Cl. 260-47.0CZ.
Linde Aktiengesellschaft: *See—*
Frank, Horst; and Langebach, Hans Peter, 4,040,266, Cl. 62-121.000.
Lindeborg, David Georg, to Norba Aktiebolag. Method of conveying and desintegrating refuse and the like, and apparatus for carrying out this method. 4,040,571, Cl. 241-30.000.
Lindemann Maschinenfabrik GmbH: *See—*
Pessel, Kurt; and Stodt, Eberhard, 4,040,230, Cl. 53-24.000.
Lindstrom, Jan Erik: *See—*
Gabrielsson, Arne Goran; and Lindstrom, Jan Erik, 4,041,417, Cl. 331-107.00R.
Lindvay, Michael W.: *See—*
Albright, James A.; and Lindvay, Michael W., 4,041,012, Cl. 260-45.80A.
Linkenheimer, Wayne H.: *See—*
Brown, William E.; Baughn, Charles O.; and Linkenheimer, Wayne H., 4,041,175, Cl. 424-311.000.
Liptak, Laszlo: *See—*
Szivos, Karoly; Lovass, Gyula; Liptak, Laszlo; Hirling, Jozsef; and Pavlik, Ozskar, 4,040,973, Cl. 252-301.10W.
Lissant, Kenneth J., to Petrolite Corporation. Non-Newtonian pharmaceutical compositions. 4,040,857, Cl. 106-243.000.
Lithium Corporation of America: *See—*
Bach, Ricardo O.; and Morrison, Robert C., 4,041,088, Cl. 260-668.00B.
Litman, Alan, to Smith & Wesson Chemical Company, Inc. Dual purpose projectile and weapon combination. 4,040,331, Cl. 89-14.00C.
Litronix, Inc.: *See—*
Murray, Roger W., 4,041,516, Cl. 357-17.000.
Littelfuse, Inc.: *See—*
Williamson, Harold L.; and Aryamane, Avinash P., 4,040,175, Cl. 29-623.000.
Litzinger, Paul C., to Crown Zellerbach Corporation. Production of discrete cellulose acetate fibers by emulsion flashing. 4,040,856, Cl. 106-170.000.
Liu, Charles Chung-Yeh; and Fuller, James Alec, to Texas Instruments Incorporated. Coaxial waveguide antenna. 4,041,499, Cl. 343-756.000.
Ljungberg, Sten Herman, to Nitro Nobel AB. Method and arrangement for charging of shotholes. 4,040,329, Cl. 86-20.00C.
Loach, James A.; and Kirby, Harold R., to Kaiser Aluminum & Chemical Corporation. Processing aluminum skim. 4,040,820, Cl. 75-68.00R.
Lockheed Aircraft Corporation: *See—*
Smethers, Rollo G., Jr., 4,040,334, Cl. 89-1.804.
Loew, Peter; Defago, Raymond; and Koller, Stefan, to Ciba-Geigy AG. Dry heat process to dyeing and printing organic material which can be dyed with cationic dyes. 4,040,779, Cl. 8-2.50R.
Logansport Machine Co., Inc.: *See—*
Wilson, John J.; and Rhoades, Donald M., 4,040,338, Cl. 92-106.000.
Logisticon, Inc.: *See—*
Blakeslee, Thomas R., 4,040,500, Cl. 180-98.000.
Lohr, Bernd: *See—*
Winkelmann, Detlef; Lohr, Bernd; and Stieger, Helmut, 4,040,735, Cl. 355-10.000.
Longton, John: *See—*
Towersey, Peter John; Longton, John; and Cockram, Geoffrey Norman, 4,041,189, Cl. 426-656.000.
Loose, Winfield Warren, to AMP Incorporated. Connector system for connecting together terminal posts arranged in two matrices whose rows and columns are interleaved. 4,041,547, Cl. 361-410.000.
Lopez, Alfred R.: *See—*
Frazita, Richard F.; Lopez, Alfred R.; and Giannini, Richard J., 4,041,501, Cl. 343-844.000.
Lorans, Dominique Y., to Societe Anonyme de Telecommunications. Machine for welding solar cell connections. 4,041,271, Cl. 219-86.000.

Lord Corporation: *See*—
Finney, Robert H., 4,040,690, Cl. 308-237.00R.

Lorenz, Douglas E.: *See*—
Petricciani, John C.; Hopps, Hope E.; Lorenz, Douglas E.; Vasington, Paul J.; and Wallace, Roslyn E., 4,040,905, Cl. 195-1.800.

Los, Marinus, to American Cyanamid Company. Dihydroimidaz oisoindolediones and the use thereof as herbicidal agents. 4,041,045, Cl. 548-302.000.

Lovass, Gyula: *See*—
Szivos, Karoly; Lovass, Gyula; Liptak, Laszlo; Hirling, Jozsef; and Pavlik, Ozskar, 4,040,973, Cl. 252-301.10W.

Loveless, Frederick C., to Uniroyal, Inc. Method for the oligomerization of alpha-olefins. 4,041,098, Cl. 260-683.15D.

Lover, Seth E., to CBS Inc. Electromagnetic pickup and method for tine-type electric piano, and piano incorporating such pickup. 4,040,321, Cl. 84-1.150.

LRS Research Limited: *See*—
Taylor, Lauren P.; and Petroski, Alex, 4,040,960, Cl. 210-96.00R.

Lucas Industries Limited: *See*—
Saunders, Arthur Frank; and Hindmarsh, Graham John, 4,040,250, Cl. 60-39.28R.
Smith, Trevor Stanley, 4,040,599, Cl. 251-28.000.

Lummus Company, The: *See*—
Sze, Morgan C.; and Snell, George J., 4,040,957, Cl. 210-73.00R.

Lundsgart, Henning Borge, to Dansk Industri Syndikat A/S. Casting mould advancing plant. 4,040,472, Cl. 164-154.000.

Lustgraaf, William John. Precision circular saw blade grinding machine. 4,040,313, Cl. 76-37.000.

Luth, Friedrich August Karl. Method for the reduction of iron ores in a shaft furnace, especially in a blast furnace with oil injection. 4,040,817, Cl. 75-42.000.

Lyke, Richard F., to Armco Steel Corporation. Magnetostriction testing apparatus having digital output display. 4,041,377, Cl. 324-34.0MA.

Lynch, Franklin Earl: *See*—
Billings, Roger Evan; and Lynch, Franklin Earl, 4,040,398, Cl. 123-44.00R.

M&T Chemicals Inc.: *See*—
Larkin, William A., 4,041,015, Cl. 260-45.75R.
Mack, Gerry P., 4,041,014, Cl. 260-45.75S.

M&T Mfg. Co.: *See*—
Pierson, Fred W., Sr.; Pierson, Fred W., Jr.; and Weidenfeller, Gordon J., 4,040,597, Cl. 249-134.000.

Maas, Michael, to Siemens Aktiengesellschaft. Arrangement for the determination and visualization of measuring signals. 4,041,328, Cl. 307-351.000.

Machleder, Warren H.: *See*—
Kuhn, Robert R.; and Machleder, Warren H., 4,040,798, Cl. 44-71.000.

Mack, Anthony: *See*—
Shumrak, George; and Mack, Anthony, 4,041,277, Cl. 219-386.000.

Mack, Gerry P., to M&T Chemicals Inc. Non-toxic stabilizer for vinyl chloride resins. 4,041,014, Cl. 260-45.75S.

Mackles, Mark, to Ralph M. Parsons Company, The. Process for desulfurization of coke oven gas. 4,041,130, Cl. 423-220.000.

Madsen, John E.; and Drabik, Walter, to General Motors Corporation. Direct current dynamoelectric machine commutating pole assembly. 4,041,338, Cl. 310-186.000.

Maekawa, Yukio; Satomura, Masato; and Umehara, Akira, to Fuji Photo Film Co., Ltd. Reactive light-sensitive high polymer compound containing furyl pentadienic ester groups and insolubilized by action of heat, light or electron beams. 4,041,017, Cl. 260-47.0UA.

Magerlein, Barney J.: *See*—
Samuelsson, Bengt; and Magerlein, Barney J., 4,041,066, Cl. 260-468.00D.

Magnesium Elektron Limited: *See*—
Clegg, Gordon A.; Cull, Geoffrey Maurice; Fisher, Phillip Andrew; and Unsworth, William, 4,040,818, Cl. 75-58.000.

Magyar Tudomanyos Akademia Izotop Intezete: *See*—
Szivos, Karoly; Lovass, Gyula; Liptak, Laszlo; Hirling, Jozsef; and Pavlik, Ozskar, 4,040,973, Cl. 252-301.10W.

Mahr, Rene N.; and Engel, Aloyse J., to S.A. Des Anciens Etablissements Paul Wurth. Shaft furnace feed device. 4,040,530, Cl. 214-35.00R.

Maier, Josef. Arrangement for connecting and aligning adjacent casting forms for the construction of multi-story buildings. 4,040,594, Cl. 249-27.000.

Maier, Karl; Hansen, Guenter; and Kermer, Wolf-Dieter, to BASF Aktiengesellschaft. p-Aminoazo disperse dyes. 4,041,025, Cl. 260-158.000.

Maillet, Alfred Marie Aime: *See*—
Braudeau, Pierre; and Maillet, Alfred Marie Aime, 4,041,268, Cl. 219-69.00G.

Main, Brian Geoffrey, to Imperial Chemical Industries Limited. 1-Hydroxyaryl-2-amidoalkylaminoethanol derivatives. 4,041,074, Cl. 260-556.0AR.

Main, James; Moss, Leslie Robert; and Perryman, Ralph. Anti-manipulation device for permutation locks. 4,040,280, Cl. 70-333.00R.

Main, W. Eric, to Motorola, Inc. Driver circuit for developing quiescent and dynamic operating signals for complementary transistors. 4,041,407, Cl. 330-13.000.

Mainiero, Michael R., to Man Barrier Corporation. Barbed metal tape. 4,040,603, Cl. 256-8.000.

Makeev, Boris Anatolievich; Stepochkin, Lev Mikhailovich; Korot, Garri Moiseevich; Batozsky, Vadim Ivanovich; Khodorov, Alexandr Iosifovich; Zhuravlev, Vitaly Ivanovich; and Eremenko, Adolf Grigorievich. Transfer machine for cutting rolled sheet metal. 4,040,318, Cl. 83-71.000.

Makhlouf, Joseph M.; and Parker, Earl E., to PPG Industries, Inc. Low smoke density fire-retardant resins. 4,041,008, Cl. 260-40.00R.

Makino, Shinobu, to FMC Corporation. Two mass vibratory material handling apparatus and methods of manufacturing and fine tuning the same. 4,040,303, Cl. 74-61.000.

Makishima, Hiroshi; Hosoda, Minoru; Kasiwagi, Eiichi; and Hayashi, Toshiharu, to Dai Nippon Tokyo Co., Ltd. Rust preventing coating composition. 4,040,842, Cl. 106-1.000.

Malafronte, Victor. Flying disc handling apparatus. 4,040,625, Cl. 273-104.000.

Maliczyszyn, Walter: *See*—
Mazzarella, Emil D.; Wood, Leonard J., Jr.; and Maliczyszyn, Walter, 4,040,900, Cl. 162-158.000.

Mallon, Joseph R.: *See*—
Kurtz, Anthony D.; and Mallon, Joseph R., 4,040,172, Cl. 29-580.000.

Malone, Hugh Robert, to Motorola, Inc. High power, pulsed microwave frequency converter. 4,041,412, Cl. 331-10.000.

Mammino, Joseph: *See*—
Goffe, William L.; Mammino, Joseph; and Ewing, Joan R., 4,040,826.

Man Barrier Corporation: *See*—
Mainiero, Michael R., 4,040,603, Cl. 256-8.000.

Mancik, Andy: *See*—
Butler, DeForest D.; and Mancik, Andy, 4,040,449, Cl. 138-92.000.

Mansmann, Manfred; and Rambold, Wolfgang, to Bayer Aktiengesellschaft. Chromium oxide pigment from sodium chromate dihydrate plus ammonium salt. 4,040,860, Cl. 106-302.000.

Mao, Chung-Ling: *See*—
O'Shea, Francis X.; and Mao, Chung-Ling, 4,041,105, Cl. 260-859.00R.

Marathon Oil Company: *See*—
Argabright, Perry A.; and Presley, C. Travis, 4,040,258, Cl. 61-36.00C.

Marchant, Kerford A., Jr.: *See*—
Lindberg, Steven E.; Marchant, Kerford A., Jr.; and Van Strien, Richard E., 4,041,065, Cl. 260-47.0CZ.

Marcillaud, Roger, to WABCO Westinghouse. Vehicle load force proportioning device. 4,040,674, Cl. 303-22.00R.

Marforio, Nerino. Closure cover for an opening providing access to sewing machine mechanisms. 4,040,368, Cl. 112-258.000.

Marforio, Nerino, to Rockwell-Rimoldi S.p.A. Stitch control device for sewing machines. 4,040,370, Cl. 112-299.000.

Margolin, Evel Grigorievich: *See*—
Axelrod, Shoya Samuilovich; Belozerov, Viktor Grigorievich; Gershman, Mikhail Bentsionovich; Margolin, Evel Grigorievich; and Shapot, Mikhail Borisovich, 4,041,218, Cl. 429-136.000.

Margotte, Dieter: *See*—
Adelmann, Siegfried; Margotte, Dieter; Vernaleken, Hugo; Niederprum, Hans; Meussdoerffer, Johann Nikolaus; and Nouvertne, Werner, 4,041,003, Cl. 260-30.80R.

Marine Engineering Systems, Inc.: *See*—
Hellerman, Lance W.; and Hollyer, Richard S., 4,040,265, Cl. 61-91.000.

Maringer, Albert, to Siemens Aktiengesellschaft. Capacitive pulse pickup. 4,041,373, Cl. 324-15.000.

Marketing Displays, Inc.: *See*—
Hillstrom, David U., 4,040,223, Cl. 52-483.000.

Marley Company, The: *See*—
Kinney, Ohler L., Jr., 4,040,824, Cl. 55-257.00R.

Marmain, Georges: *See*—
Abblard, Jean; Marmain, Georges; and Viricel, Andree, 4,041,109, Cl. 260-927.00R.

Marquardt, Robert Alden, to General Electric Company. Acoustic data acquisition system. 4,041,442, Cl. 340-6.00R.

Marquis, Edward T.; and Watts, Lewis W., Jr., to Texaco Development Corporation. Method of preparing polyaminopolyphenylmethanes. 4,041,078, Cl. 260-570.00D.

Marsee, Frederick J., to Ethyl Corporation. Spark vacuum advance control. 4,040,401, Cl. 123-117.00A.

Marsh, Harold E., Jr.: *See*—
United States of America, National Aeronautics and Space Administration; Mueller, William A.; Hsu, George C.; and Marsh, Harold E., Jr., 4,041,233, Cl. 536-56.000.

Marshall, David W.; MCGrath, Kenneth W.; O'Day, William R., Jr.; and Wilder, Thomas C., to Kennecott Copper Corporation. Multiple-track cathode for electroformation of metallic filaments. 4,040,942, Cl. 204-13.000.

Marshall, Peter Edward George: *See*—
Burton, Peter Edward; Pasquire, Derek James; and Marshall, Peter Edward George, 4,041,272, Cl. 219-89.000.

Martin, David James Reginald, to Coal Industry (Patents) Limited. Apparatus for determining the position of a object. 4,041,495, Cl. 343-112.00R.

Martin, David Michael, to Iowa State University Research Foundation, Inc. Scanning electron microscope with color image display. 4,041,311, Cl. 250-311.000.

Martin, Fred David: *See*—
Persinski, Leonard J.; Martin, Fred David; and Adams, Sally Lee, 4,040,854, Cl. 106-90.000.

Martin, Paul: *See*—
Francois, Bernard; Vernois, Michel; Martin, Paul; and Franta, Emile, 4,040,815, Cl. 75-.50B.

Marting, Donald G.: *See*—
Davis, Rufus F., Jr.; and Marting, Donald G., 4,040,961, Cl. 210-195.00R.

Martinsons, Aleksandrs: *See*—
Johnson, Harlan B.; Martinsons, Aleksandrs; and Snodgrass, John O., 4,040,918, Cl. 204-98.000.
Martocci, Anthony P.: *See*—
Francisco, Herbert H.; Martocci, Anthony P.; and Beitel, Sydney B., 4,041,273, Cl. 219-121.0EM.
Maruyama, Eiichi: *See*—
Shidara, Keiichi; Goto, Naohiro; Maruyama, Eiichi; Hirai, Tadaaki; and Fujita, Tsutomu, 4,040,985, Cl. 252-501.000.
Maruyama, Mitsuaki: *See*—
Ido, Kazuo; and Maruyama, Mitsuaki, 4,041,295, Cl. 235-156.000.
Maruzen Petrochemical Co., Ltd.: *See*—
Hayashi, Kiyoshige; Nakaniwa, Mikio; Kobayashi, Nobuyuki; Yamamoto, Minoru; and Hase, Yoshihiko, 4,040,946, Cl. 208-131.000.
Marvin Glass & Associates: *See*—
Barlow, Gordon A.; and Isaacson, Anson, 4,040,621, Cl. 273-85.00C.
Marx, Richard Everet: *See*—
Napoli, Louis Sebastian; and Marx, Richard Everet, 4,041,307, Cl. 250-203.00R.
Marzoli, Angelo, to F. lli Marzoli & C. S.p.A. Machine for loosening and removing textile fibers from fiber bales. 4,040,145, Cl. 19-81.000.
Marzoli, Angelo, to F. lli Marzoli & C. S.p.A. Device for distributing textile fiber slivers inside collection boxes in spinning preparation machines. 4,040,146, Cl. 19-159.00R.
Masaki, Katsumi; Hirayama, Kazuhiro; Sato, Yasushi; and Hirabayashi, Yoichi, to Canon Kabushiki Kaisha. Method and arrangement for eliminating ghost image. 4,040,737, Cl. 355-49.000.
Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft: *See*—
Tronsberg, Walter, 4,040,163, Cl. 29-423.000.
Maschinenfabrik Wifag: *See*—
Gertsch, Peter; and Wehrli, Alfons, 4,040,348, Cl. 101-350.000.
Mascioli, Rocco L.: *See*—
Bechara, Ibrahim S.; Carroll, Felix P.; Holland, Dewey G.; and Mascioli, Rocco L., 4,040,992, Cl. 260-2.5AW.
Masel, Jacob J. Orthodontic neck band including safety strap. 4,040,188, Cl. 32-14.00D.
Maske, Fred, to General Mills Chemicals, Inc. Dispersible glyoxal-xanthan gum complexes. 4,041,234, Cl. 536-114.000.
Mason, Stanley I., Jr.; Handler, Michael D.; and Richardson, James E., to Simco, Inc. Dispenser for vaporizable material accentuated by ambient air flow. 4,040,568, Cl. 239-57.000.
Mass Transfer Limited: *See*—
McKeown, Kevin Joseph, 4,041,113, Cl. 261-98.000.
Massachusetts Institute of Technology: *See*—
Javan, Ali, 4,041,475, Cl. 340-173.0LS.
Masson Scott Thrissell Engineering Limited: *See*—
Walkington, Colin, 4,040,617, Cl. 271-177.000.
Mast, John G., to Textron, Inc. Elimination of extraneous modulation from VHF omnirange receiver. 4,041,493, Cl. 343-106.00R.
Masterfield, Clarence William, to Raymond Lee Organization, Inc., The, a part interest. Airplane route viewing system. 4,041,529, Cl. 358-109.000.
Masuyama, Takeshi: *See*—
Matsuura, Mikio; Nishi, Nobuji; Yamaguchi, Masatsugu; Matsuoka, Michio; and Masuyama, Takeshi, 4,041,437, Cl. 338-35.000.
Masuyama, Tetsuo: *See*—
Onoda, Takeru; and Masuyama, Tetsuo, 4,041,082, Cl. 260-604.0HF.
Mathy, Wolfgang: *See*—
Glaeser, Wolfgang; and Mathy, Wolfgang, 4,041,138, Cl. 423-464.000.
Matrosov, Evgeny Arkadievich: *See*—
Shikhirev, Boris Nikolaevich; Matrosov, Evgeny Arkadievich; and Deresh, Ilya Abramovich, 4,040,209, Cl. 51-80.00A.
Matsubara, Izuru, to Dai Nippon Insatsu Kabushiki Kaisha; and Meiji Seika Kabushiki Kaisha. Kaleidoscopic peep-show viewing device. 4,040,716, Cl. 350-4.000.
Matsubara, Yukio: *See*—
Iijima, Ryozo; Matsubara, Yukio; Yamaguchi, Ginichi; and Fukushima, Masatoshi, 4,040,937, Cl. 204-281.000.
Matsuda, Fumio: *See*—
Ohta, Kazuho; Matsuda, Fumio; Tanaka, Tsutomu; Ohnuki, Katsuhiro; Miyaji, Naotaka; and Sato, Hidetoshi, 4,041,256, Cl. 179-182.00R.
Matsuda, Isamu; and Ono, Taizo, to Matsushita Electric Industrial Co., Ltd. Display device. 4,040,193, Cl. 40-28.00C.
Matsuda, Ken; and Barber, William Austin, to American Cyanamid Company. Reduced copper catalyst on support. 4,040,980, Cl. 252-463.000.
Matsuda, Yasumasa; Kimura, Ichiro; Sagawa, Akio; and Hiramatsu, Tsutomu, to Hitachi, Ltd. Apparatus for detecting misfire in multicylinder internal combustion engine. 4,040,294, Cl. 73-117.300.
Matsui, Takeshi: *See*—
Wada, Yukio; Abura, Yoshinori; and Matsui, Takeshi, 4,040,696, Cl. 339-8.00R.
Matsukawa, Hiroharu: *See*—
Hayashi, Takao; and Matsukawa, Hiroharu, 4,041,193, Cl. 427-151.000.
Matsumoto, Hiroshi: *See*—
Ogata, Masaru; and Matsumoto, Hiroshi, 4,041,026, Cl. 260-239.30D.
Matsuoka, Michio: *See*—
Matsuura, Mikio; Nishi, Nobuji; Yamaguchi, Masatsugu; Matsuoka, Michio; and Masuyama, Takeshi, 4,041,437, Cl. 338-35.000.
Matsushita Electric Corporation of America: *See*—
Rzeszewski, Theodore S.; Frantzis, Paul D.; and Sideris, Sotirios, 4,041,535, Cl. 358-191.000.
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Matsuda, Isamu; and Ono, Taizo, 4,040,193, Cl. 40-28.00C.
Matsuura, Mikio; Nishi, Nobuji; Yamaguchi, Masatsugu; Matsuoka, Michio; and Masuyama, Takeshi, 4,041,437, Cl. 338-35.000.
Mizushima, Wataru; Nakata, Koreaki; Hamasaki, Nobuhiro; and Iida, Yoshio, 4,041,359, Cl. 361-433.000.
Nagata, Takashi; Ishibashi, Michio; and Nakajima, Yasuo, 4,041,335, Cl. 310-321.000.
Nitta, Tsuneharu; Hayakawa, Shigeru; Kasahara, Yukio; and Terada, Ziro, 4,041,140, Cl. 423-561.00R.
Sato, Teruo, 4,041,481, Cl. 340-324.00M.
Yamamoto, Katsuhiko; Hontani, Kunihiko; Kitaura, Hiromu; and Nakamura, Michio, 4,041,533, Cl. 358-160.000.
Yamazaki, Osamu; Miki, Sukeichi; and Takezaki, Tsuneo, 4,041,244, Cl. 179-15.0BT.
Matsushita Electric Works, Ltd.: *See*—
Wada, Yukio; Abura, Yoshinori; and Matsui, Takeshi, 4,040,696, Cl. 339-8.00R.
Matsuura, Mikio; Nishi, Nobuji; Yamaguchi, Masatsugu; Matsuoka, Michio; and Masuyama, Takeshi, to Matsushita Electric Industrial Co., Ltd. Humidity sensor. 4,041,437, Cl. 338-35.000.
Matsuyama, Junichi; Hinata, Masanao; and Sato, Akira, to Fuji Photo Film Co., Ltd. Direct-positive process utilizing a supersensitized silver halide emulsion. 4,040,839, Cl. 96-64.000.
Matt, Richard J.; and Thompson, Richard T., to Textron, Inc. Method of making a low-friction fabric bearing. 4,040,883, Cl. 156-148.000.
Matz, Bjorn J.; and Foster, Edward J., to Dictaphone Corporation. Central dictation system with privacy signal used for transcribing scanning. 4,041,249, Cl. 179-100.1DR.
Matzen, Nils Denny. Method of charging drill holes and means for carrying out the method. 4,040,330, Cl. 86-20.00C.
Maurer, Fritz; Riebel, Hans-Jochem; Hammann, Ingeborg; and Stendel, Wilhelm, to Bayer Aktiengesellschaft. O-alkyl-0-[1-(3-nitrophenyl)-2-carbalkoxy-vinyl]-thiono(thiol)-phosphoric (phosphonic) acid esters. 4,041,158, Cl. 424-212.000.
Mayes, Gary Wayne: *See*—
Davis, Michael Ian; Mayes, Gary Wayne; McDermott, Thomas Stephen; and Wise, Larry Edward, 4,041,462, Cl. 364-200.000.
Mayol, George. Folding picnic table. 4,040,658, Cl. 297-159.000.
Mays, Robert K.: *See*—
Williams, Lloyd E.; Mays, Robert K.; and Wagner, Joseph E., III, 4,041,135, Cl. 423-329.000.
Mazzarella, Emil D.; Wood, Leonard J., Jr.; and Maliczyszyn, Walter, to National Starch and Chemical Corporation. Method of sizing paper. 4,040,900, Cl. 162-158.000.
McBride, Robert B.; and Tiberio, Phillip J., to General Electric Company. Moisture and rust detector for hydraulic control systems. 4,040,790, Cl. 23-253.00C.
McCabe, Francis J. Clutch motor for use in resettable fire damper. 4,040,304, Cl. 74-230.17T.
McClure, James D., to Shell Oil Company. Ethylbenzene process using an unsupported perfluorinated polymer catalyst. 4,041,090, Cl. 260-671.00R.
McCollister, Howard L.: *See*—
Kormanyos, Kenneth R.; McCollister, Howard L.; and White, Paul L., 4,041,215, Cl. 429-104.000.
McCormick, Harold E., to Ramsey Corporation. Low friction balanced piston ring. 4,040,637, Cl. 277-224.000.
McCormick, Joseph F., to Ruben, Murray A. Electrical linear force motor for servo controls, fluid valves, and the like. 4,040,445, Cl. 137-596.180.
McCoy, Rawley D.: *See*—
Bradley, Frank R.; and McCoy, Rawley D., 4,041,254, Cl. 179-175.30R.
McCray, Walter A.; and Smith, Charles L., to Hilti Aktiengesellschaft. Method of making or repairing and securing lugs and trunnion members to ingot molds. 4,040,471, Cl. 164-92.000.
McDaniel, Gayner R.: *See*—
Goodling, John S.; McDaniel, Gayner R.; and Steadham, Richard A., 4,040,425, Cl. 128-303.140.
McDermott, Thomas Stephen: *See*—
Davis, Michael Ian; Mayes, Gary Wayne; McDermott, Thomas Stephen; and Wise, Larry Edward, 4,041,462, Cl. 364-200.000.
McDonnell Douglas Corporation: *See*—
Schlanert, George A.; Wood, Lorin A.; and Rayburn, Gerald A., 4,040,581, Cl. 244-83.00K.
Wiggins, Edwin W.; and Carpenter, James F., 4,040,991, Cl. 260-2.5BD.
McDonnell, Roger P.: *See*—
Fong, Ronald A.; Latty, James A.; and McDonnell, Roger P., 4,041,006, Cl. 260-33.6UA.
McDougall, Ian Leitch, to Imperial Metal Industries (Kynoch) Limited. Formers for coils. 4,040,173, Cl. 29-599.000.
McFadden, Russell T.: *See*—
Gross, James R.; and McFadden, Russell T., 4,041,231, Cl. 526-317.000.
McGinniss, Vincent D., to SCM Corporation. Ultraviolet curing of electrocoating compositions. 4,040,925, Cl. 204-181.000.
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Marshall, David W.; MCGrath, Kenneth W.; O'Day, William R., Jr.; and Wilder, Thomas C., 4,040,942, Cl. 204-13.000.
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Gaia, Aldino J., 4,041,435, Cl. 337-159.000.

McGraw, Philip W.; Doorakian, George A.; and Rains, Randall C., to Dow Chemical Company, The. Delayed-action, heat activated-urethane catalyst. 4,041,019, Cl. 260-75.0NC.

McGrew, Carl A.: *See—*
Taylor, John W., Jr.; and McGrew, Carl A., 4,041,491, Cl. 343-100.00R.

McKee, William H.; and Witte, Roy, to TRW Inc. Solderless termination system. 4,040,702, Cl. 339-97.00R.

McKenna, James: *See—*
Oppenheim, Carl Emil; and McKenna, James, 4,040,362, Cl. 105-226.000.

McKeown, Kevin Joseph, to Mass Transfer Limited. Tower packing elements. 4,041,113, Cl. 261-98.000.

McKinney, Joel D.; and Mitchell, Bruce R., to Gulf Research & Development Company. Hydrocarbon catalytic cracking process. 4,040,945, Cl. 208-113.000.

McKinney, Maurice E., to United States of America, Navy. Variable camber leading edge airfoil system. 4,040,579, Cl. 244-214.000.

McLaughlin, James L.: *See—*
Ashworth, James G.; Glock, Eugene; Kelly, James G.; McLaughlin, James L.; and Merwin, Owen T., 4,040,431, Cl. 131-140.00P.

McLay, Roger Berry Cameron. Interconnecting bracket for logs. 4,040,589, Cl. 248-300.000.

McNeely, Charles D., to NEPRO, Inc. Heating unit. 4,040,567, Cl. 237-81.000.

McNeill, Frederick M.: *See—*
Simons, Sanford L.; and McNeill, Frederick M., 4,040,788, Cl. 23-230.00R.

McNeill, William H.; Haugsjaa, Paul O.; Lech, Joseph; and Regan, Robert J., to GTE Laboratories Incorporated. Automatic starting system for solid state powered electrodeless lamps. 4,041,352, Cl. 315-248.000.

McPherson, Gerry E., to General Steel Industries, Inc. Apparatus and method for forming water stops on insulated pipe. 4,041,198, Cl. 427-294.000.

McTamaney, Louis S.: *See—*
Westerman, David J.; McTamaney, Louis S.; and Kauber, David J., 4,041,331, Cl. 307-252.00Q.

Mead Corporation, The: *See—*
Kraus, Walter R.; Kelch, David J.; and Jensen, Gerald A., 4,040,928, Cl. 204-195.00M.

Medved, Donald C.: *See—*
Collins, Edward J.; and Medved, Donald C., 4,040,777, Cl. 431-95.00A.

Meidert, Helmut: *See—*
Muller, Werner Heinrich; Hey, Hansjorg; and Meidert, Helmut, 4,041,049, Cl. 260-343.500.

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Matsubara, Izuru, 4,040,716, Cl. 350-4.000.

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Broemer, Heinz; and Meinert, Norbert, 4,040,846, Cl. 106-47.00Q.

Meininger, James R., to Brunswick Corporation. Back draft carburetor for two cycle engines. 4,040,399, Cl. 123-65.00R.

Meitner, Gary H.: *See—*
Brock, Robert J.; and Meitner, Gary H., 4,041,203, Cl. 428-157.000.

Melan, Giuseppe-Fabrizio Mario; and Nicoulaud, Jean Raymond, to Saint-Gobain Industries. Strand attenuation and winding apparatus and method. 4,040,572, Cl. 242-18.00A.

Melcher, Robert Lee; and Shiren, Norman Steven, to International Business Machines Corporation. Optical scanner. 4,041,536, Cl. 358-213.000.

Melen, Roger D. Low transient effect switching device and method. 4,041,519, Cl. 357-30.000.

Menager, Olivier: *See—*
Desormiere, Bernard; Menager, Olivier; Courty, Albert; and Eumurian, Gregoire, 4,041,419, Cl. 333-30.00R.

Mencarini, Richard: *See—*
Stockdale, Douglas P.; Mencarini, Richard; Deaton, Carlton D.; and Owen, Ralph M., 4,040,234, Cl. 53-38.000.

Merck & Co., Inc.: *See—*
Firestone, Raymond A.; Cama, Lovji D.; and Christensen, Burton G., 4,041,029, Cl. 544-25.000.

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Esselborn, Reiner; and Bernhard, Horst, 4,040,859, Cl. 106-291.000.

Merkert, Rodney Francis, to Union Carbide Corporation. Method of producing a composition containing a large amount of vanadium and nitrogen. 4,040,814, Cl. 75-.5BC.

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Metcalf, Brian Walter; and Jung, Michel, 4,041,041, Cl. 260-293.860.

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Merwin, Owen T.: *See—*
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Vig, Istvan, 4,040,765, Cl. 408-239.00A.

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Schwaerzler, Hans-Juergen, 4,040,580, Cl. 244-78.000.

Messina, Ralph Paul: *See—*
Compa, Russell Edward; Liebowitz, Marvin; and Messina, Ralph Paul, 4,041,205, Cl. 428-220.000.

Metallgesellschaft Aktiengesellschaft: *See—*
Rammler, Roland, 4,040,958, Cl. 210-73.00R.
Rudolph, Paul; Bierbach, Herbert; Kupfer, Hans; Hafke, Carl; and Kohlen, Rudolf, 4,040,800, Cl. 48-85.200.

Metcalf, Brian Walter; and Jung, Michel, to Merrell Toraude et Compagnie. Acetylene derivatives of amino acids. 4,041,041, Cl. 260-293.860.

Metzner, Wolfgang; and Koddebusch, Hubert, to Desowag-Bayer Holzschutz GmbH. Preservative composition for wood and wood building materials and method of using same. 4,041,176, Cl. 424-318.000.

Meussdoerffer, Johann Nikolaus: *See—*
Adelmann, Siegfried; Margotte, Dieter; Vernaleken, Hugo; Niederprum, Hans; Meussdoerffer, Johann Nikolaus; and Nouvertne, Werner, 4,041,003, Cl. 260-30.80R.

Meyer, Bengt E., to Eaton Corporation. Pulley splitting machine-control system. 4,040,281, Cl. 72-10.000.

Meyer, Jeffrey G., to Anderson Development Company. Chromium tris-diorgano-orthophosphate-alkyl aluminum halide catalysts for olefin polymerization and alkylation of aromatic compounds. 4,041,226, Cl. 526-144.000.

Michel, Wilfried; Reichert, Hartmut; and Willmann, Erich, to Simplex Time Recorder. Attendance time recorder. 4,041,503, Cl. 346-83.000.

Midwinter, John Edwin; and Day, Clive Richard, to Post Office, The. Drawing dielectric optical waveguides. 4,040,807, Cl. 65-3.00A.

Miessler, James D.; and Johnson, Arne I., to Albany International Corporation. Method of making syntatic modules. 4,040,165, Cl. 29-458.000.

Miiller, William Clyde, to Johns-Manville Corporation. Temperature stable fibrous insulation composition and "wet" package formed thereof. 4,040,847, Cl. 106-69.000.

Miki, Sukeichi: *See—*
Yamazaki, Osamu; Miki, Sukeichi; and Takezaki, Tsuneo, 4,041,244, Cl. 179-15.0BT.

Mikulecky, Karel: *See—*
Burysek, Frantisek; Mikulecky, Karel; and Janousek, Jan, 4,040,573, Cl. 242-35.50A.

Milionis, Jerry Peter; and Spicer, Larry Dean, to American Cyanamid Company. Resin compositions containing 0,0,0',0'-tetramethyl 0,0'-thiodi-p-phenylene phosphorothioate. 4,041,151, Cl. 424-78.000.

Miller, Dale E.; Chapman, William L.; Dunster, Donald E.; and Thomas, Bobby J., to Continental Oil Company. Apparatus for multi-channel induced polarization surveying. 4,041,372, Cl. 324-9.000.

Miller, Gary E., to Agrimatic Corporation. Method and apparatus for automatic egg injection. 4,040,388, Cl. 119-1.000.

Mine Safety Appliances Company: *See—*
Giebel, Joseph L., 4,040,376, Cl. 114-221.00A.

Minknow, Morse: *See—*
Gorsky, Egon; and Minknow, Morse, 4,040,246, Cl. 58-23.00R.

Minnesota Mining and Manufacturing Company: *See—*
Stroom, Paul D.; and Braunreiter, Carl J., 4,040,474, Cl. 165-9.000.
Vandervort, John D., 4,040,383, Cl. 118-60.000.

Minolta Camera Kabushiki Kaisha: *See—*
Tanaka, Harumi, 4,041,509, Cl. 354-152.000.

Mischenko, Alexandr Petrovich: *See—*
Smirnov, Viktor Sergeevich; Gryaznov, Vladimir Mikhailovich; Lebedeva, Valentina Ivanovna; Mischenko, Alexandr Petrovich; Polyakova, Victoria Petrovna; and Savitsky, Evgeny Mikhailovich, 4,041,093, Cl. 260-673.500.

Misiaszek, Emil J.: *See—*
Williams, Raymond H.; and Misiaszek, Emil J., 4,041,502, Cl. 346-33.00A.

Missioux, Jean Leon. Autonomous group for mechanical control of machines. 4,040,509, Cl. 192-150.000.

Misu, Takashi: *See—*
Takada, Koji; and Misu, Takashi, 4,040,920, Cl. 204-129.750.

Mita Industrial Co. Ltd.: *See—*
Washio, Takaji; Sasaki, Koichi; and Aizawa, Tatsuo, 4,040,387, Cl. 118-658.000.

Mitchell, Bruce R.: *See—*
McKinney, Joel D.; and Mitchell, Bruce R., 4,040,945, Cl. 208-113.000.

Mitchell, William Eric, to Dunlop Limited. Wheel rim assemblies. 4,040,465, Cl. 152-381.100.

Mitsubishi Chemical Industries Limited: *See—*
Okamoto, Shosuke; Kikumoto, Ryoji; Ohkubo, Kazuo; Tezuka, Tohru; Tonomura, Shinji; Tamao, Yoshikuni; and Hijikata, Akiko, 4,041,156, Cl. 424-177.000.
Onoda, Takeru; and Masuyama, Tetsuo, 4,041,082, Cl. 260-604.0HF.

Mitsubishi Denki Kabushiki Kaisha: *See—*
Takada, Koji; and Misu, Takashi, 4,040,920, Cl. 204-129.750.
Takahashi, Masaru, 4,040,653, Cl. 292-202.000.

Mitsubishi Jidosha Kogyo Kabushiki Kaisha: *See—*
Yoshida, Hiroshi; Kozuka, Hajime; Sakano, Toyoshi; Honda, Yoichiro; and Omuro, Shojiro, 4,040,502, Cl. 180-149.000.

Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
Atsukawa, Masumi; Kamei, Kazumi; Shinoda, Naoharu; and Ushio, Hiroyuki, 4,040,803, Cl. 55-73.000.
Katarao, Tadamichi, 4,040,302, Cl. 74-37.000.
Yoshida, Hiroshi; Kozuka, Hajime; Sakano, Toyoshi; Honda, Yoichiro; and Omuro, Shojiro, 4,040,502, Cl. 180-149.000.

Mitsubishi Rayon Co., Ltd.: *See—*
Ide, Fumio; Kishida, Kazuo; and Osaka, Norihisa, 4,041,106, Cl. 260-876.00R.
Oshima, Akira; Yoshihara, Keisuke; Shiki, Mikio; and Ikeda, Tuneo, 4,041,120, Cl. 264-171.000.

Mitsui Mining & Smelting Co., Ltd.: *See*—
Saitoh, Kozo; and Izumi, Sumio, 4,040,949, Cl. 209-166.000.
Tokunaga, Koichi; and Fukuda, Akira, 4,040,525, Cl. 214-6.00P.
Miyabe, Atsushi, to Hochiki Corporation. Output circuit of an ionization smoke sensor. 4,041,479, Cl. 340-237.00S.
Miyagawa, Akira: *See*—
Nagatugi, Shuzo; Miyagawa, Akira; and Fukuoka, Suguru, 4,040,879, Cl. 149-18.000.
Miyaji, Naotaka: *See*—
Ohta, Kazuho; Matsuda, Fumio; Tanaka, Tsutomu; Ohnuki, Katsuhiro; Miyaji, Naotaka; and Sato, Hidetoshi, 4,041,256, Cl. 179-182.00R.
Miyakawa, Nobuaki, to Hitachi, Ltd. Multiplication apparatus. 4,041,299, Cl. 364-841.000.
Miyasaka, Nobuaki: *See*—
Hinata, Masanao; Takei, Haruo; Miyasaka, Nobuaki; and Takahashi, Kenji, 4,040,833, Cl. 96-45.100.
Miyazaki, Kenichi: *See*—
Miyoshi, Tadayoshi; Nakagaki, Shintaro; Takanashi, Itsuo; Yokokawa, Sumio; Miyazaki, Kenichi; Tumiyama, Hisanori; and Motoyama, Koithiro, 4,041,528, Cl. 358-47.000.
Miyoshi, Tadayoshi; Nakagaki, Shintaro; Takanashi, Itsuo; Yokokawa, Sumio; Miyazaki, Kenichi; Tumiyama, Hisanori; and Motoyama, Koithiro, to Victor Company of Japan, Limited. Color television signal generating apparatus for use in a single camera tube. 4,041,528, Cl. 358-47.000.
Miyoshi, Taturu: *See*—
Mukaemachi, Takuzi; Toyama, Toshiaki; and Miyoshi, Taturu, 4,041,246, Cl. 179-18.0GF.
Mizushima, Wataru; Nakata, Koreaki; Hamasaki, Nobuhiro; and Iida, Yoshio, to Matsushita Electric Industrial Co., Ltd. Method of making an electrolytic capacitor and electrolytic capacitor made thereby. 4,041,359, Cl. 361-433.000.
Mobil Oil Corporation: *See*—
Ireland, Henry R.; and Stein, Thomas R., 4,041,097, Cl. 260-676.00R.
Johnson, David Emil, 4,040,574, Cl. 242-56.00A.
Kuo, James C.; Prater, Charles Dwight; and Wise, John J., 4,041,094, Cl. 260-676.00R.
Kuo, James C., 4,041,095, Cl. 260-676.00R.
Kuo, James C., 4,041,096, Cl. 260-676.00R.
Mochizuki, Hiroshi: *See*—
Tanaka, Eizi; Mochizuki, Hiroshi; Kosuda, Tooru; Abe, Seikou; and Ohashi, Michihiro, 4,040,405, Cl. 123-139.0BG.
Mogendorf, Friedel: *See*—
Pielsticker, Klaus Peter; Mogendorf, Friedel; and Sonnabend, Karl Heinrich, 4,040,514, Cl. 198-774.000.
Mogi, Takao, to Sony Corporation. Channel selection and indicating system. 4,041,402, Cl. 325-465.000.
Mohla, Prem P.: *See*—
Hetke, Adolf; Mohla, Prem P.; and Warrick, Robert J., 4,040,821, Cl. 75-134.00S.
Moise, Alain: *See*—
Dumont, Pierre; and Moise, Alain, 4,041,236, Cl. 13-25.000.
Mole, Cecil J., to Westinghouse Electric Corporation. Segmented magnet homopolar dynamoelectric machines having fluid cooled liquid metal current collecting zones. 4,041,337, Cl. 310-178.000.
Molina, Orlando G., to Rockwell International Corporation. Water washable dye penetrant composition and method of application. 4,041,310, Cl. 250-302.000.
Molins, Desmond Walter; and Jackson, Norman Walter, to Molins Limited. Apparatus for making composite filters. 4,040,341, Cl. 93-77.0FT.
Molins, Desmond Walter, to Molins Limited. Method and apparatus for making filter cigarettes. 4,040,430, Cl. 131-94.000.
Molins Limited: *See*—
Molins, Desmond Walter; and Jackson, Norman Walter, 4,040,341, Cl. 93-77.0FT.
Molins, Desmond Walter, 4,040,430, Cl. 131-94.000.
Monacelli, Umberto. Tack-strip as obtained by head-cementing. 4,040,325, Cl. 85-17.000.
Monarch Marking Systems, Inc.: *See*—
Jenkins, William A., 4,040,555, Cl. 227-67.000.
Mondshine, Thomas C., to N L Industries, Inc. Laundering of oil base mud cuttings. 4,040,866, Cl. 134-26.000.
Monroe, James E., Jr., to United States of America, Energy Research and Development Administration. Thermionic energy converters. 4,040,903, Cl. 176-39.000.
Monsanto Company: *See*—
Li, Tao P., 4,040,978, Cl. 252-437.000.
Seelye, John F., 4,041,124, Cl. 264-336.000.
Monsanto Research Corporation: *See*—
David, Donald J.; and Willson, Michael C., 4,040,691, Cl. 312-31.000.
David, Donald J.; and Hardy, Edgar E., 4,040,749, Cl. 356-201.000.
Garner, Albert Y., 4,040,780, Cl. 8-116.00P.
Mookherjee, Braja Dulal: *See*—
Shuster, Edward J.; Withycombe, Donald Arthur; Mookherjee, Braja Dulal; and Mussinan, Cynthia J., 4,040,987, Cl. 252-522.000.
Moore, Donald G., to Chemetron Corporation. Sensor and tray arrangement. 4,041,266, Cl. 219-10.55E.
Moore, George Edgar; and Morris, Alan Francis, to Dehye Harvesters Limited. Feed roller mechanisms for forage harvesters. 4,040,344, Cl. 100-95.000.
Moore, Raymond H., to Battelle Memorial Institute. Method for removing sulfur oxide from waste gases and recovering elemental sulfur. 4,041,142, Cl. 423-573.00G.
Moore, Robert E.; and Janoski, Edward J., to Sun Ventures, Inc. Process of manufacture of flourinated alkyladamantanes. 4,041,086, Cl. 260-648.00F.
Moore, Thomas M., to United States of America, Army. Lockwood airfoil used in conjunction with man transport device. 4,040,577, Cl. 244-4.00A.
Morcos, Nabil A.; Bruno, Gerald A.; and Haney, Thomas A., to E. R. Squibb & Sons, Inc. Multiple pH alumina columns for molybdenum-99/technetium-99m generators. 4,041,317, Cl. 250-432.0PD.
Morgan, A. Perry, Jr. Table apparatus including a lockable, rotatable tray. 4,040,364, Cl. 108-28.000.
Morgan, George W.: *See*—
Chaney, Preston E.; and Morgan, George W., 4,040,262, Cl. 61-86.000.
Morgan, Neal O.: *See*—
Eby, Harry J.; and Morgan, Neal O., 4,040,810, Cl. 71-9.000.
Morphy, Paul H., to Hobart Corporation. Method of construction of insulated cabinet. 4,040,166, Cl. 29-460.000.
Morris, Alan Francis: *See*—
Moore, George Edgar; and Morris, Alan Francis, 4,040,344, Cl. 100-95.000.
Morris, George E., to General Electric Company. Control circuit for an electric motor. 4,041,360, Cl. 318-221.00R.
Morrison, Charles F., Jr., to Valleylab, Inc. Electrosurgical method and apparatus for initiating an electrical discharge in an inert gas flow. 4,040,426, Cl. 128-303.170.
Morrison, Robert C.: *See*—
Bach, Ricardo O.; and Morrison, Robert C., 4,041,088, Cl. 260-668.00B.
Morton-Norwich Products, Inc.: *See*—
Schwan, Thomas J., 4,041,035, Cl. 260-251.00R.
Moser, Robert E.; Powers, Larry J.; and Ariyan, Zaven S., to Diamond Shamrock Corporation. Antiinflammatory imidazothiazoles. 4,041,167, Cl. 424-270.000.
Mosier, John E., to Halliburton Company. Railway train control simulator and method. 4,041,283, Cl. 235-150.200.
Mosier, Stanley A.; and Pierce, Robert M., to United Technologies Corporation. Catalytic premixing combustor. 4,040,252, Cl. 60-39.360.
Moss, Gerald, to Exxon Research and Engineering Company. Production of elemental sulphur. 4,041,141, Cl. 423-571.000.
Moss, Leslie Robert: *See*—
Main, James; Moss, Leslie Robert; and Perryman, Ralph, 4,040,280, Cl. 70-333.00R.
Motohashi, Michio: *See*—
Sugihara, Hirosada; Motohashi, Michio; Watanabe, Masazumi; Nishikawa, Masao; and Sanno, Yasushi, 4,041,079, Cl. 260-574.000.
Motorola, Inc.: *See*—
Fedde, Chris Steven, 4,041,396, Cl. 325-150.000.
Main, W. Eric, 4,041,407, Cl. 330-13.000.
Malone, Hugh Robert, 4,041,412, Cl. 331-10.000.
Schroeder, Daniel Ray, 4,041,390, Cl. 325-21.000.
Wechsler, Reuben, 4,041,267, Cl. 219-10.55B.
Motoyama, Koithiro: *See*—
Miyoshi, Tadayoshi; Nakagaki, Shintaro; Takanashi, Itsuo; Yokokawa, Sumio; Miyazaki, Kenichi; Tumiyama, Hisanori; and Motoyama, Koithiro, 4,041,528, Cl. 358-47.000.
Moya, Castulo J. A rotating beacon for a bicycle. 4,041,452, Cl. 340-134.000.
Mrcun, Ivan. Brushless alternator. 4,041,340, Cl. 310-263.000.
Mudiare, Edeki, to LaSalle Steel Company. Process for strengthening of carbon steels. 4,040,872, Cl. 148-12.00B.
Mueller, Richard A., to G. D. Searle & Co. 3,5-Bisoxygenated 2-(ω-halo-3-oxo-1-alkenyl)-cyclopentane-1-heptanoic acids and derivatives thereof. 4,041,050, Cl. 260-345.700.
Mueller, Rudolf, to Schering Aktiengesellschaft. Liquid reaction vessel with means for removing deposits on its inner walls. 4,040,606, Cl. 259-107.000.
Mueller, William A.: *See*—
United States of America, National Aeronautics and Space Administration; Mueller, William A.; Hsu, George C.; and Marsh, Harold E., Jr., 4,041,233, Cl. 536-56.000.
Muench, Jerome T.: *See*—
Campbell, George W., Jr.; Wilkins, David G.; and Muench, Jerome T., 4,041,132, Cl. 423-279.000.
Muenchinger, Herman G., to Research Engineering & Manufacturing, Inc. Thread-forming fastener having dual lobulation and dies for making the same. 4,040,328, Cl. 85-46.000.
Mukaemachi, Takuzi; Toyama, Toshiaki; and Miyoshi, Taturu, to Hitachi, Ltd. Thyristor cross-point switch with control. 4,041,246, Cl. 179-18.0GF.
Muller, Martin: *See*—
Kyri, Hans; Brandle, Karl; Muller, Martin; and Heine, Heinrich, 4,040,850, Cl. 106-87.000.
Muller, Werner Heinrich; Hey, Hansjorg; and Meidert, Helmut, to Hoechst Aktiengesellschaft. Process for the manufacture of cyclohexane-1,3-diones and 6-alkyl-3,4-dihydro-2-pyranones. 4,041,049, Cl. 260-343.500.
Munnis, David V.: *See*—
Taylor, Peter, 4,040,205, Cl. 46-51.000.
Murakami, Masuo; Takahashi, Kozo; Hirata, Yasuhumi; Takashima, Mutsuo; Takeda, Masaaki; Ino, Hiroyoshi; and Iwanami, Sumio, to

Yamanouchi Pharmaceutical Co., Ltd. Pyrazine derivatives. 4,041,032, Cl. 260-250.0BN.

Muramoto, Kenichi: *See—*
Fuse, Noboru; and Muramoto, Kenichi, 4,041,517, Cl. 357-22.000.

Murray, Roger W., to Litronix, Inc. High intensity light-emitting diode. 4,041,516, Cl. 357-17.000.

Murty, Dasika R.: *See—*
Pagnucco, Rinaldo G.; Muse, Roberta J.; and Murty, Dasika R., 4,041,147, Cl. 195-103.50A.

Muscarella, Ida M., administratrix: *See—*
Clarkson, Stanley G.; and Muscarella, Joseph N., deceased, 4,040,616, Cl. 271-65.000.

Muscarella, Joseph N., deceased: *See—*
Clarkson, Stanley G.; and Muscarella, Joseph N., deceased, 4,040,616, Cl. 271-65.000.

Muse, Roberta J.: *See—*
Pagnucco, Rinaldo G.; Muse, Roberta J.; and Murty, Dasika R., 4,041,147, Cl. 195-103.50A.

Mussinan, Cynthia J.: *See—*
Shuster, Edward J.; Withycombe, Donald Arthur; Mookherjee, Braja Dulal; and Mussinan, Cynthia J., 4,040,987, Cl. 252-522.000.

Mysels, Karol J., to General Atomic Company. Method for axially shuffling fuel elements in a nuclear reactor. 4,040,902, Cl. 176-30.000.

N L Industries, Inc.: *See—*
Mondshine, Thomas C., 4,040,866, Cl. 134-26.000.
Wright, Alan C.; and Rupert, Joseph Paul, 4,040,974, Cl. 252-316.000.

N. V. Optische Industrie "De Oude Delft": *See—*
Groeneweg, Abraham, 4,040,723, Cl. 350-203.000.
van der Does, Lucas, 4,040,614, Cl. 271-19.000.

Naarden International N.V.: *See—*
Boelens, Harmannus; Takken, Hendrik J.; and Traas, Petrus C., 4,040,986, Cl. 252-522.000.

Nagai, Yuji: *See—*
Takeda, Shiroh; Nagai, Yuji; and Suzuki, Takenori, 4,041,009, Cl. 260-42.180.

Nagaoka, Shinji: *See—*
Kitai, Kiyoshi; Nakamura, Yukio; Kato, Shogo; and Nagaoka, Shinji, 4,041,511, Cl. 354-232.000.

Nagata, Takashi; Ishibashi, Michio; and Nakajima, Yasuo, to Matsushita Electric Industrial Co., Ltd. Piezoelectric ceramic resonator with vibration damping means. 4,041,335, Cl. 310-321.000.

Nagatugi, Shuzo; Miyagawa, Akira; and Fukuoka, Suguru, to Daicel Ltd. Process for preparing a match head composition containing particulate nitrocellulose and no sulfur. 4,040,879, Cl. 149-18.000.

Naiman, Michael I.: *See—*
Heintzelman, William J.; and Naiman, Michael I., 4,041,056, Cl. 260-404.500.

Naito, Kenji: *See—*
Nakamura, Akihisa; Kamezaki, Takashi; Naito, Kenji; and Usui, Kunichika, 4,041,112, Cl. 261-72.00R.

Nakagaki, Shintaro: *See—*
Miyoshi, Tadayoshi; Nakagaki, Shintaro; Takanashi, Itsuo; Yokokawa, Sumio; Miyazaki, Kenichi; Tumiyama, Hisanori; and Motoyama, Koithiro, 4,041,528, Cl. 358-47.000.

Nakajima, Yasuo: *See—*
Nagata, Takashi; Ishibashi, Michio; and Nakajima, Yasuo, 4,041,335, Cl. 310-321.000.

Nakamura, Akihisa; Kamezaki, Takashi; Naito, Kenji; and Usui, Kunichika, to Honda Giken Kogyo Kabushiki Kaisha. Carburetor for vehicle engines. 4,041,112, Cl. 261-72.00R.

Nakamura, Kotaro: *See—*
Arai, Atsuaki; Shiba, Keisuke; Yamada, Minoru; Furutachi, Nobuo; and Nakamura, Kotaro, 4,040,835, Cl. 96-56.500.
Arai, Atsuaki; Nakamura, Kotaro; Yamada, Minoru; and Furutachi, Nobuo, 4,040,836, Cl. 96-56.500.

Nakamura, Michio: *See—*
Yamamoto, Katsuhiko; Hontani, Kunihiko; Kitaura, Hiromu; and Nakamura, Michio, 4,041,533, Cl. 358-160.000.

Nakamura, Shoichi: *See—*
Umeda, Kenkichi; Nakamura, Shoichi; Takayama, Jun; Horichi, Tetsuya; and Tsuchiya, Yoshikazu, 4,041,453, Cl. 340-146.1BE.

Nakamura, Yosihiko: *See—*
Isogai, Mitsuyuki; Tikusa, Kouiti; and Nakamura, Yosihiko, 4,040,162, Cl. 29-420.500.

Nakamura, Yukio: *See—*
Kitai, Kiyoshi; Nakamura, Yukio; Kato, Shogo; and Nagaoka, Shinji, 4,041,511, Cl. 354-232.000.

Nakaniwa, Mikio: *See—*
Hayashi, Kiyoshige; Nakaniwa, Mikio; Kobayashi, Nobuyuki; Yamamoto, Minoru; and Hase, Yoshihiko, 4,040,946, Cl. 208-131.000.

Nakaoka, Kazuhide; and Araki, Kenji, to Nippon Kokan Kabushiki Kaisha. Method of making low yield point cold-reduced steel sheet by continuous annealing process. 4,040,873, Cl. 148-12.00C.

Nakata, Koreaki: *See—*
Mizushima, Wataru; Nakata, Koreaki; Hamasaki, Nobuhiro; and Iida, Yoshio, 4,041,359, Cl. 361-433.000.

Nalco Chemical Company: *See—*
Basila, Michael R.; and Broersma, Frank R., 4,040,982, Cl. 252-466.00J.

Nanao, Teruaki: *See—*
Okada, Yoshitsugu; Nanao, Teruaki; and Sugino, Toshio, 4,040,443, Cl. 137-546.000.

Napoli, Louis Sebastian; and Marx, Richard Everet, to RCA Corporation. Positioning a platform with respect to rays of a light source. 4,041,307, Cl. 250-203.00R.

Narcy, Jean-Paul: *See—*
Renaud, Jean; and Narcy, Jean-Paul, 4,040,989, Cl. 252-548.000.

Nathan, Ira M.: *See—*
Berman, Irwin R.; and Nathan, Ira M., 4,040,959, Cl. 210-78.000.

National Institute for Researches in Inorganic Materials: *See—*
Fujiki, Yoshinori; and Izumi, Fujio, 4,041,143, Cl. 423-598.000.

National Starch and Chemical Corporation: *See—*
Mazzarella, Emil D.; Wood, Leonard J., Jr.; and Maliczyszyn, Walter, 4,040,900, Cl. 162-158.000.
Szymanski, Chester D.; and DeMartino, Ronald, 4,041,001, Cl. 260-29.6WA.

National Steel Corporation: *See—*
Saunders, William T., 4,040,282, Cl. 72-41.000.

NCR Corporation: *See—*
Shah, Niranjan S.; and Taylor, James F., 4,041,472, Cl. 364-900.000.
Stewart, John W., 4,041,546, Cl. 361-152.000.

Neely, James W., to Rohm and Haas Company. Partially pyrolyzed macroporous polymer particles having multimodal pore distribution with macropores ranging from 50–100,000 angstroms. 4,040,990, Cl. 260-2.10R.

Negard, Donald J. Pneumatic wheel balancing apparatus. 4,040,300, Cl. 73-459.000.

Negishi, Masaaki: *See—*
Watanabe, Haruo; Kitagawa, Toru; Negishi, Masaaki; Aonuki, Kiichi; and Kobayashi, Harunobu, 4,041,059, Cl. 260-424.000.

Neher, Robert; and Kahnt, Friedrich Werner, to Ciba-Geigy Corporation. Process for the manufacture of thyrocalcitonin. 4,041,022, Cl. 260-112.50T.

Neilon, Claude R., to Armco Steel Corporation. Controlled buoyancy underwater riser system. 4,040,264, Cl. 61-86.000.

Nelms, Leonard H.; Reiszner, Kenneth D.; and West, Philip W., to Board of Supervisors Louisiana State University Agricultural and Mechanical College. Personal monitoring device, or dosimeter, for measuring exposure of personnel to organic vapors. 4,040,805, Cl. 55-158.000.

Nelson, Alvin I.; Steinberg, Marvin P.; and Wei, Lun-Shin, to University of Illinois Foundation, The. Soybean beverage and process. 4,041,187, Cl. 426-598.000.

Nelson, Peter H.; and Untch, Karl G., to Syntex (U.S.A.) Inc. 2-Carboxy-(7-,8- and 9-substituted)-5-oxo-5H-dibenzo (a,d) cycloheptenes and the corresponding 10,11-dihydro compounds. 4,041,173, Cl. 424-308.000.

Nelson, Wayne F., to Dow Chemical Company, The. Differential valve. 4,040,488, Cl. 166-317.000.

Nemeth, Joseph, to Champion Spark Plug Company. Aqueous dispersion of ceramic slurry. 4,040,998, Cl. 260-29.20M.

Neotec Corporation: *See—*
Webster, Donald R., 4,040,747, Cl. 356-188.000.

NEPRO, Inc.: *See—*
McNeely, Charles D., 4,040,567, Cl. 237-81.000.

Ness, Warren C. Method of and means for indexing articles. 4,040,512, Cl. 198-460.000.

Netzer, Siegfried: *See—*
Ahaus, Gerhard; Netzer, Siegfried; and Liebig, Hans-Peter, 4,040,673, Cl. 303-6.00C.

Neuber, Ralph E.; and Rehkopf, Charles H., to GTE Sylvania Incorporated. Cathode ray tube base. 4,040,708, Cl. 339-111.000.

Newhall, William F., to FMC Corporation. Plant regulator compositions based on 2-hydroxycycloalkyl quaternary ammonium compounds. 4,040,813, Cl. 71-121.000.

Newland, Gordon C.: *See—*
Pacifici, James G.; Newland, Gordon C.; and Beard, Hobert M., Jr., 4,040,923, Cl. 204-159.150.
Wang, Richard H. S.; Newland, Gordon C.; and Pacifici, James G., 4,040,922, Cl. 204-159.150.

Newnam, James Alvis: *See—*
Cooper, John LaMonte; and Newnam, James Alvis, 4,040,371, Cl. 112-420.000.

Newstead, Charles, to Girling Limited. Hydraulically operated disc brakes for vehicles. 4,040,506, Cl. 188-72.500.

Newsteder, Robert. Aquarium bracket assembly. 4,040,586, Cl. 248-14.000.

Nicastro, Francis J.: *See—*
Clovis, James S.; Dohling, Jerome; and Nicastro, Francis J., 4,040,913, Cl. 203-69.000.

Nickel, Bernd: *See—*
Schwarz, Werner; Hohmann, Eugen; and Nickel, Bernd, 4,041,276, Cl. 219-308.000.

Nicoulaud, Jean Raymond: *See—*
Melan, Giuseppe-Fabrizio Mario; and Nicoulaud, Jean Raymond, 4,040,572, Cl. 242-18.00A.

Nidola, Antonio; Spaziante, Placido M.; and de Nora, Vittorio, to Diamond Shamrock Technologies S.A. Cathode starting blanks for metal deposition. 4,040,914, Cl. 204-12.000.

Niederprum, Hans: *See—*
Adelmann, Siegfried; Margotte, Dieter; Vernaleken, Hugo; Niederprum, Hans; Meussdoerffer, Johann Nikolaus; and Nouvertne, Werner, 4,041,003, Cl. 260-30.80R.

Nielsen, Asger Torben, to Addressograph Multigraph Corporation. Light beam controller. 4,040,722, Cl. 350-161.00W.

Nieman, John R., to Caterpillar Tractor Co. Method and apparatus for introducing additives into a casting mold. 4,040,468, Cl. 164-55.000.

Niese, Karl; and Hundhausen, Eckhard, to Braun Aktiengesellschaft.

Automatic opening of juice outflow conduit in response to detection of container, without physical contact. 4,040,457, Cl. 141-361.000.
Nieuwenhoven, Hendricus Jacobus Cornelis: *See—*
van der Lely, Cornelis; and Nieuwenhoven, Hendricus Jacobus Cornelis, 4,040,227, Cl. 52-745.000.
Niles Parts Company, Limited: *See—*
Harada, Shinichi, 4,041,258, Cl. 200-6.00A.
Nilsson, Mats Ake. Device at road roller. 4,040,762, Cl. 404-129.000.
Nimerick, Kenneth H.; and Simpson, Benny E., to Dow Chemical Company, The. Method of fracturing subterranean formations penetrated by a well. 4,040,967, Cl. 252-8.55R.
Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha: *See—*
Amemiya, Kiyosi; and Takida, Hiroshi, 4,041,223, Cl. 526-10.000.
Nippon Hoso Kyokai: *See—*
Shidara, Keiichi; Goto, Naohiro; Maruyama, Eiichi; Hirai, Tadaaki; and Fujita, Tsutomu, 4,040,985, Cl. 252-501.000.
Nippon Kokan Kabushiki Kaisha: *See—*
Nakaoka, Kazuhide; and Araki, Kenji, 4,040,873, Cl. 148-12.00C.
Nippon Soken, Inc.: *See—*
Tanaka, Eizi; Mochizuki, Hiroshi; Kosuda, Tooru; Abe, Seikou; and Ohashi, Michihiro, 4,040,405, Cl. 123-139.0BG.
Nishi, Nobuji: *See—*
Matsuura, Mikio; Nishi, Nobuji; Yamaguchi, Masatsugu; Matsuoka, Michio; and Masuyama, Takeshi, 4,041,437, Cl. 338-35.000.
Nishikawa, Masaji, to Olympus Optical Co., Ltd. Electrophotographic apparatus having a screen-type photoconductive drum. 4,040,731, Cl. 355-3.00R.
Nishikawa, Masao: *See—*
Sugihara, Hirosada; Motohashi, Michio; Watanabe, Masazumi; Nishikawa, Masao; and Sanno, Yasushi, 4,041,079, Cl. 260-574.000.
Nishimura, Hajime; and Nomura, Yasushi, to Citizen Watch Company Limited. Silver peroxide-zinc battery. 4,041,219, Cl. 429-144.000.
Nisson Motor Company, Limited: *See—*
Tagawa, Katsuhiro, 4,040,404, Cl. 123-136.000.
Nitro Nobel AB: *See—*
Ljungberg, Sten Herman, 4,040,329, Cl. 86-20.00C.
Nitta, Tsuneharu; Hayakawa, Shigeru; Kasahara, Yukio; and Terada, Ziro, to Matsushita Electric Industrial Co., Ltd. Method of making a sulphide ceramic body. 4,041,140, Cl. 423-561.00R.
Nittetsu Mining Company, Ltd.: *See—*
Fukazawa, Koji, 4,040,519, Cl. 209-166.000.
Nixdorf Computer AG: *See—*
Hanewinkel, Lorenz, 4,041,406, Cl. 329-107.000.
Noble, Charles H. Ductile cast iron articles. 4,040,875, Cl. 148-35.000.
Noens, Richard H., to Vapor Corporation. Electronic railroad track marker system. 4,041,448, Cl. 340-32.000.
Noeske, Heinz: *See—*
Bexten, Ludger; Noeske, Heinz; Tummes, Hans; and Cornils, Boy, 4,041,081, Cl. 260-601.00R.
Noeske, Heinz O., to General Electric Company. Electric circuit interrupter of the puffer type comprising a magnetically actuated piston. 4,041,263, Cl. 200-148.00A.
Nohira, Hidetaka; Kobashi, Kiyoshi; and Tanaka, Masaaki, to Toyota Jidosha Kogyo Kabushiki Kaisha. Exhaust gas re-circulation system for an internal combustion engine. 4,040,402, Cl. 123-119.00A.
Noji, Tasuku; and Yasuma, Yoichi, to Alps Electric Co., Ltd. Fine tuning assembly for preset tuner. 4,041,422, Cl. 334-49.000.
Nolan, John J., to Sala Magnetics, Inc. Air-precluding flow regulator. 4,040,444, Cl. 137-561.00A.
Nomitsas, Richardas Prano: *See—*
Iodvalkis, Vitautas Jurgio; Nomitsas, Richardas Prano; Andreev, Anatoly Fedorovich; and Grekov, Vladimir Borisovich, 4,041,504, Cl. 354-23.00R.
Nomura, Yasushi: *See—*
Nishimura, Hajime; and Nomura, Yasushi, 4,041,219, Cl. 429-144.000.
Norba Aktiebolag: *See—*
Lindeborg, David Georg, 4,040,571, Cl. 241-30.000.
Norberg, Gayle Russell, to Control Data Corporation. Interrogation and monitoring system. 4,041,455, Cl. 340-146.10C.
Nordbak, John A. Apparatus for making a prestressed concrete slab. 4,040,775, Cl. 425-111.000.
Nordblad, Sven Sigurd; and Svensson, Karl-Erik, to Telefonaktiebolaget L M Ericsson. Apparatus for continuously cooling wire shaped objects. 4,040,269, Cl. 62-374.000.
Norman, Don T., to Continental Carbon Company. Gas burner for carbon black reactor. 4,040,792, Cl. 23-259.500.
Norris, Paul R. Automatic direction finding system. 4,041,496, Cl. 343-113.0DE.
North Electric Company: *See—*
Cowden, Earl Thomas, 4,041,252, Cl. 179-170.0NC.
Northern Conveyor & Manufacturing Corporation: *See—*
Zimmerman, John E.; and Reis, Richard M., Sr., 4,040,278, Cl. 69-42.000.
Northern Research and Engineering Corporation: *See—*
Heitmann, Arnold M.; Brassert, Walter L.; and Chouinard, Donald N., 4,040,251, Cl. 60-39.360.
Northern Telecom Limited: *See—*
Cambridge, Ronan Malcolm; and Watson, Douglas John, 4,041,255, Cl. 179-175.30R.
Northrop Corporation: *See—*
Ault, Earl R.; Stevens, Philip C.; Sipman, Robert H.; and Bradford, Robert S., Jr., 4,041,415, Cl. 331-94.5PE.
Nouvertne, Werner: *See—*
Adelmann, Siegfried; Margotte, Dieter; Vernaleken, Hugo; Niederprum, Hans; Meussdoerffer, Johann Nikolaus; and Nouvertne, Werner, 4,041,003, Cl. 260-30.80R.
Nuovo Pignone S.p.A.: *See—*
Santucci, Nicola, 4,040,452, Cl. 139-302.000.
Oades, John Willson, to GTE Automatic Electric Laboratories Incorporated. Nonfrequency-converting microwave radio repeater using a low power consumption amplifier. 4,041,389, Cl. 325-3.000.
Obara, Isao; and Yagami, Kazuo, to Kohjin Co., Ltd. Process for preparing stannic oxide hydrate. 4,041,144, Cl. 423-618.000.
Oberton, Serafin Bess, to Petrolite Corporation. Electrofiltration process for purifying organic liquids. 4,040,926, Cl. 204-186.000.
O'Brien, Edward F., to Package Machinery Company. Sealing jaw mechanism for package making machine. 4,040,237, Cl. 53-180.00M.
Obuch, Edward A., to Amerace Corporation. Electrical terminating device. 4,040,700, Cl. 339-95.00R.
O'Day, William R., Jr.: *See—*
Marshall, David W.; MCGrath, Kenneth W.; O'Day, William R., Jr.; and Wilder, Thomas C., 4,040,942, Cl. 204-13.000.
O'Dell, Dennis R. Holder for glass cutter. 4,040,182, Cl. 30-164.950.
Offeringa, Jan, to Shell Oil Company. Recovery of oil by circulating hot fluid through a gas-filled portion of a network interconnected fractures. 4,040,483, Cl. 166-272.000.
Officine Savio, S.p.A.: *See—*
Speranzin, Claudio, 4,040,241, Cl. 57-35.000.
Ogata, Masaru; and Matsumoto, Hiroshi, to Shionogi & Co., Ltd. 1,5-Dihydro-2H-1,4-benzodiazepin-2-one derivatives. 4,041,026, Cl. 260-239.30D.
Ogawa, Akira: *See—*
Sugiyama, Masatoshi; and Ogawa, Akira, 4,040,840, Cl. 96-84.00A.
Oguey, Henri J.; and Gerber, Bernard, to Centre Electronique Horloger S.A. Integrated circuit and manufacture thereof. 4,041,522, Cl. 357-42.000.
Ohashi, Michihiro: *See—*
Tanaka, Eizi; Mochizuki, Hiroshi; Kosuda, Tooru; Abe, Seikou; and Ohashi, Michihiro, 4,040,405, Cl. 123-139.0BG.
Ohhinata, Ichiro; Okuhara, Shinzi; and Tokunaga, Michio, to Hitachi, Ltd. Semiconductor switch device. 4,041,332, Cl. 307-252.00J.
Ohkubo, Kazuo: *See—*
Okamoto, Shosuke; Kikumoto, Ryoji; Ohkubo, Kazuo; Tezuka, Tohru; Tonomura, Shinji; Tamao, Yoshikuni; and Hijikata, Akiko, 4,041,156, Cl. 424-177.000.
Ohmatsu, Hideki; and Ueda, Hirozo, to Fuji Photo Film Co., Ltd. Multilayer multicolor photographic materials. 4,040,829, Cl. 96-6.000.
Ohmichi, Yasuyuki: *See—*
Kikuchi, Yasuo; Ohmichi, Yasuyuki; Terasaki, Osamu; and Sakai, Koichi, 4,041,428, Cl. 335-210.000.
Ohnuki, Katsuhiro: *See—*
Ohta, Kazuho; Matsuda, Fumio; Tanaka, Tsutomu; Ohnuki, Katsuhiro; Miyaji, Naotaka; and Sato, Hidetoshi, 4,041,256, Cl. 179-182.00R.
Ohsako, Kyoichi; and Yamashita, Katusuke, to Laurel Bank Machine Co., Ltd. Money counting machine. 4,041,280, Cl. 235-92.0CN.
Ohsako, Kyoichi: *See—*
Watanabe, Kenkichi; and Ohsako, Kyoichi, 4,040,434, Cl. 133-1.00A.
Ohshiro, Susumu, to Fuji Photo Optical Co. Ltd. Endoscope. 4,040,413, Cl. 128-6.000.
Ohta, Kazuho; Matsuda, Fumio; Tanaka, Tsutomu; Ohnuki, Katsuhiro; Miyaji, Naotaka; and Sato, Hidetoshi, to Victor Company of Japan, Limited. Open-back type headphone with a detachable attachment. 4,041,256, Cl. 179-182.00R.
Ohtsuka, Takaaki; Satake, Keigo; Yamazaki, Shiro; Hatakeyama, Nobuo; and Watanabe, Takeo, to Kureha Kagaku Kogyo Kabushiki Kaisha. Field and garden agricultural fungicide. 4,041,170, Cl. 424-277.000.
Okada, Yoshitsugu; Nanao, Teruaki; and Sugino, Toshio, to Kubota, Ltd. Sleeve valve. 4,040,443, Cl. 137-546.000.
Okamoto, Shosuke; Kikumoto, Ryoji; Ohkubo, Kazuo; Tezuka, Tohru; Tonomura, Shinji; Tamao, Yoshikuni; and Hijikata, Akiko, to Mitsubishi Chemical Industries Limited. N^2-alkoxynaphthalenesulfonyl-L-argininamides and the pharmaceutically acceptable salts thereof. 4,041,156, Cl. 424-177.000.
Okamoto, Toshiki: *See—*
Abe, Tatsuo; Okamoto, Toshiki; Sakakura, Takao; and Tateno, Tatsuo, 4,041,137, Cl. 423-489.000.
Okuhara, Shinzi: *See—*
Ohhinata, Ichiro; Okuhara, Shinzi; and Tokunaga, Michio, 4,041,332, Cl. 307-252.00J.
Olinkraft, Inc.: *See—*
Bamburg, Robert A.; Duncan, Farris N.; and Floyd, Roger M., 4,040,558, Cl. 229-23.0BT.
Oliver, Ray J.; and Sammarcelli, Stanford M. Cover and lock for keyboard of an electronic organ. 4,040,335, Cl. 84-183.000.
Olmstead, Clarence W.; and Triquet, Fred E., to Arco Industries Corporation. Sealing grommet. 4,041,241, Cl. 174-153.00G.
Olsen, Robert H. Mooring whip base. 4,040,377, Cl. 114-230.000.
Olsen, Sydney A.: *See—*
Kahle, Glenn W.; and Olsen, Sydney A., 4,040,249, Cl. 60-39.51H.
Olympus Optical Co., Ltd.: *See—*
Nishikawa, Masaji, 4,040,731, Cl. 355-3.00R.
Tsuda, Naotsune, 4,040,174, Cl. 29-603.000.
Olympus Optical Co., Ltd: *See—*
Sato, Masanobu, 4,041,250, Cl. 179-100.110.

Omodei-Sale', Amedeo: *See*—
Pifferi, Giorgio; Omodei-Sale', Amedeo; and Consonni, Pietro, 4,041,048, Cl. 260-333.000.
Omron Tateisi Electronics Co.: *See*—
Kurita, Masakatsu, 4,040,721, Cl. 350-160.0LC.
Omuro, Shojiro: *See*—
Yoshida, Hiroshi; Kozuka, Hajime; Sakano, Toyoshi; Honda, Yoichiro; and Omuro, Shojiro, 4,040,502, Cl. 180-149.000.
Onahama Seiren Kabushiki Kaisha: *See*—
Iijima, Ryozo; Matsubara, Yukio; Yamaguchi, Ginichi; and Fukushima, Masatoshi, 4,040,937, Cl. 204-281.000.
O'Neill, Gerald J.: *See*—
Simons, Charles W.; O'Neill, Gerald J.; and Gribens, Joel A., 4,041,148, Cl. 424-45.000.
Onkyo Kabushiki Kaisha: *See*—
Hino, Masanori; Eguchi, Taro; and Shiraga, Chitoshi, 4,040,503, Cl. 181-192.000.
Ono, Taizo: *See*—
Matsuda, Isamu; and Ono, Taizo, 4,040,193, Cl. 40-28.00C.
Onoda, Takeru; and Masuyama, Tetsuo, to Mitsubishi Chemical Industries Limited. Process for producing aldehydes. 4,041,082, Cl. 260-604.0HF.
Onodera, Toshio, to Sony Corporation. High voltage generating circuit. 4,041,355, Cl. 315-411.000.
Onopchenko, Anatoli: *See*—
Barie, Walter P., Jr.; Onopchenko, Anatoli; and Schulz, Johann G. D., 4,041,004, Cl. 260-32.8EP.
Ooms, Adam: *See*—
Holster, Peter Leendert; Ooms, Adam; and van den Hoogen, Marinus Johannes Gerardus, 4,040,290, Cl. 73-71.000.
Ophaug, Darrell P.; and Layton, Beryl W., to Square D Company. Undervoltage release for circuit breaker. 4,041,423, Cl. 335-20.000.
OPI Metriservice, Societe Anonyme: *See*—
Lefebvre, Michel Serge, 4,040,353, Cl. 101-426.000.
Oppelt, Hans, to Bodenseewerk, Geratetechnik GmbH. Detector device responsive to infrared radiation. 4,041,314, Cl. 250-352.000.
Oppenheim, Carl Emil; and McKenna, James, to Chemetron Corporation. Railway bolster integral wear liner. 4,040,362, Cl. 105-226.000.
Orihara, Ituo: *See*—
Suzuki, Akira; Orihara, Ituo; and Ishida, Akira, 4,041,235, Cl. 428-413.000.
Orlens, Alfreds; and Hubbard, David W., to Pitney-Bowes, Inc. Label printing apparatus with tape cassette. 4,040,346, Cl. 101-336.000.
Ornstein, Leonard: *See*—
Kim, Young Ran; Ornstein, Leonard; and Waters, Henry Cook, III, 4,040,785, Cl. 23-230.00B.
Ort, Jay E., to RecTech, Inc. Anaerobic digestion process. 4,040,953, Cl. 210-6.000.
Orth, Edward D.; Roberts, John A.; and Smith, Raymond J. D., to General Electric Company. Wet chlorine gas generator for instrument applications. 4,040,936, Cl. 204-271.000.
Orthuber, Richard K., to International Telephone and Telegraph Corporation. Electron multiplier mosaic. 4,041,343, Cl. 313-105.00R.
Ortiz, Nilson V., to Ortiz, Nilson V.; and Rollojay, Francisco R. Electrical safety outlet and plug. 4,040,698, Cl. 339-75.00P.
Osaka, Norihisa: *See*—
Ide, Fumio; Kishida, Kazuo; and Osaka, Norihisa, 4,041,106, Cl. 260-876.00R.
Osborn, William P.: *See*—
Pearne, Frank S.; Pearne, Florentin J.; Osborn, William P.; King, Terance M.; and Guzzetta, Joseph A., 4,040,532, Cl. 214-152.000.
O'Shea, Francis X.; and Mao, Chung-Ling, to Uniroyal, Inc. Polyurethane elastomer derived from graft of ethylenically unsaturated monomer on polyalkylene ether glycol. 4,041,105, Cl. 260-859.00R.
Oshima, Akira; Yoshihara, Keisuke; Shiki, Mikio; and Ikeda, Tuneo, to Mitsubishi Rayon Co., Ltd. Process for producing a synthetic resin article having improved resistance to surface abrasion. 4,041,120, Cl. 264-171.000.
O'Steen, Alvan D. Windshield wiper installation. 4,040,141, Cl. 15-250.190.
Ostop, John A.: *See*—
Johnson, Joseph E.; and Ostop, John A., 4,040,877, Cl. 148-187.000.
Ostrem, Obert M.; Kulikowski, Donald F.; and Pulciani, Sam C., to Continental Group, Inc., The. Edge protection for easy opening end closure. 4,040,540, Cl. 220-273.000.
Otaki, Hideyuki, to Agency of Industrial Science and Technology. High fatigue screw threads. 4,040,327, Cl. 85-46.000.
Ott, Albert. Interchangeable probe tip for a magnetic thickness gauge. 4,041,378, Cl. 324-34.0TK.
Ott, Cynthia Bunce: *See*—
Ott, David M.; Ott, Cynthia Bunce; and Stoides, John G., 4,041,456, Cl. 340-146.30R.
Ott, David M.; Ott, Cynthia Bunce; and Stoides, John G. Method for verifying the denomination of currency. 4,041,456, Cl. 340-146.30R.
Ott, Howard E. Tethered ball and loop toy or exercising device. 4,040,623, Cl. 273-98.000.
Otten, Hans-Gunter: *See*—
Wolfrum, Gerhard; and Otten, Hans-Gunter, 4,041,024, Cl. 260-158.000.
Ottmann, Norman; and Strever, Walter, to Atlantic Pipe Corporation. Method and apparatus for making concrete pipe. 4,041,118, Cl. 264-71.000.
Oude Alink, Bernardus A.; Thompson, Neil E. S.; and Hutton, Ronald P., to Petrolite Corporation. Cyclohexlamines used as fuel additives. 4,040,799, Cl. 44-75.000.
Oulton, T. Dixon: *See*—
Isaac, Peter A. H.; and Oulton, T. Dixon, 4,040,648, Cl. 282-27.500.
Outboard Marine Corporation: *See*—
Betts, E. Douglas, 4,040,379, Cl. 115-37.000.
Blanchard, Clarence E., 4,040,378, Cl. 115-74.000.
Owen, Ralph M.: *See*—
Stockdale, Douglas P.; Mencarini, Richard; Deaton, Carlton D.; and Owen, Ralph M., 4,040,234, Cl. 53-38.000.
Owens-Illinois, Inc.: *See*—
Kormanyos, Kenneth R.; McCollister, Howard L.; and White, Paul L., 4,041,215, Cl. 429-104.000.
Owlett, David Donald, to GTE Automatic Electric Laboratories Incorporated. Stabilized locking mechanism for threaded tuning screws in waveguides. 4,041,421, Cl. 333-73.00W.
Paca, Francis B. See-through mirror with spaced reflective strips. 4,040,726, Cl. 350-288.000.
Pacifici, James G.; Newland, Gordon C.; and Beard, Hobert M., Jr., to Eastman Kodak Company. Photopolymerizable polymeric compositions containing halogen containing aromatic ketones. 4,040,923, Cl. 204-159.150.
Pacifici, James G.: *See*—
Wang, Richard H. S.; Newland, Gordon C.; and Pacifici, James G., 4,040,922, Cl. 204-159.150.
Package Machinery Company: *See*—
O'Brien, Edward F., 4,040,237, Cl. 53-180.00M.
Page, Derrick J.: *See*—
Schlegel, Earl S.; and Page, Derrick J., 4,040,170, Cl. 29-577.000.
Page, Joe W., Jr.; and Stahlhuth, Paul H., to Page, Joe W., Jr. Dental handpiece. 4,040,311, Cl. 74-750.00R.
Pagnucco, Rinaldo G.; Muse, Roberta J.; and Murty, Dasika R., to E. R. Squibb & Sons, Inc. Angiotensin iradioimmunoassay. 4,041,147, Cl. 195-103.50A.
Palmaer, Tore Georg. Headband with receiver and directional antenna. 4,041,497, Cl. 343-702.000.
Paltior Corporation, The: *See*—
Skubic, Leroy F., 4,040,228, Cl. 52-710.000.
Papenfuhs, Theodor: *See*—
Hahnke, Manfred; and Papenfuhs, Theodor, 4,041,054, Cl. 260-393.000.
Papsco, Inc.: *See*—
Papsco, William G.; Cohn, Harry, Jr.; and Bryan, Robert E., 4,040,588, Cl. 248-245.000.
Papsco, William G.; Cohn, Harry, Jr.; and Bryan, Robert E., to Papsco, Inc. Bracket base. 4,040,588, Cl. 248-245.000.
Parker, Earl E.: *See*—
Makhlouf, Joseph M.; and Parker, Earl E., 4,041,008, Cl. 260-40.00R.
Parker, George E.; and Garvey, Daniel C., to Woodward Governor Company. Electromagnetic actuator. 4,041,429, Cl. 335-276.000.
Parker-Hannifin Corporation: *See*—
Albertson, Kenneth Ray; and Beck, Gerald Helmut, 4,040,636, Cl. 277-188.00A.
Parker, Robert R., to Bell & Howell Company. Low noise magnetic transducer preamplifier having flat response. 4,041,538, Cl. 360-67.000.
Parker, Sidney A.: *See*—
Pfarrer, David M.; and Parker, Sidney A., 4,041,542, Cl. 361-27.000.
Parkyns, Raymond; and Hubble, Terence H. Bows for musical instruments. 4,040,322, Cl. 84-282.000.
Parliment, Thomas Holden, to General Foods Corporation. Blueberry flavor. 4,041,185, Cl. 426-534.000.
Parmer, Edward: *See*—
Richmond, Raymond; Parmer, Edward; and Parmer, Edward G., Jr., 4,040,675, Cl. 303-89.000.
Parmer, Edward G., Jr.: *See*—
Richmond, Raymond; Parmer, Edward; and Parmer, Edward G., Jr., 4,040,675, Cl. 303-89.000.
Parr, Erfried: *See*—
Roebke, Wolfgang; Kneitel, Dieter; and Parr, Erfried, 4,040,972, Cl. 252-179.000.
Pasculle, Maurice J.; Merrill, Edgar F.; and Heyne, Carl J., to Westinghouse Electric Corporation. Field protector for synchronous machines. 4,041,543, Cl. 361-33.000.
Pasquire, Derek James: *See*—
Burton, Peter Edward; Pasquire, Derek James; and Marshall, Peter Edward George, 4,041,272, Cl. 219-89.000.
Passavant-Werke Michelbacher Hutte: *See*—
Jopp, Wolfgang, 4,040,952, Cl. 210-400.000.
Passler, Helmar: *See*—
Heger, Adolf; Passler, Helmar; and Bennemann, Frank, 4,041,192, Cl. 427-43.000.
Pate, Ronald W., to River Range Developments Limited. Radio control transmitter. 4,041,394, Cl. 325-102.000.
Patrick, William John; and Westdorp, Wolfgang Alfred, to International Business Machines Corporation. Control of oxygen in silicon crystals. 4,040,895, Cl. 156-618.000.
Patterson, Silla. Cooking utensil. 4,040,539, Cl. 220-22.000.
Pattison, Victor A., to Hooker Chemicals & Plastics Corporation. Polymeric fluoromethylated dienes. 4,041,229, Cl. 526-249.000.
Pauli, Ernest H., to Hilliard Corporation, The. Drive coupling. 4,040,757, Cl. 403-356.000.
Paulson, Merle R.: *See*—
Bauer, Peter W.; and Paulson, Merle R., 4,041,397, Cl. 325-304.000.

Paulus, Gerhard: *See—*
Schoeppl, Hubert; Petersen, Harro; Paulus, Gerhard; and Queins, Hubertus, 4,041,222, Cl. 526-6.000.
Pavda, Philip D. Dollars and cents telephone metering computer. 4,041,291, Cl. 235-156.000.
Pavlik, Ozskar: *See—*
Szivos, Karoly; Lovass, Gyula; Liptak, Laszlo; Hirling, Jozsef; and Pavlik, Ozskar, 4,040,973, Cl. 252-301.10W.
Pawl, Eddie. Sports training aid. 4,040,632, Cl. 273-189.00A.
Payne, Frederick George, to Canron Limited. Steel mill rolls. 4,040,158, Cl. 29-123.000.
Peak, Steven C.; and Anderson, Thomas E., to General Electric Company. Circuit for detecting a malfunction in an inverter. 4,041,365, Cl. 363-58.000.
Pearlstein, Barry S.: *See—*
Evans, Norol T.; Pearlstein, Barry S.; Job, Merlin A.; and Hoagland, Donald L., 4,041,487, Cl. 343-7.500.
Pearne, Florentin J.: *See—*
Pearne, Frank S.; Pearne, Florentin J.; Osborn, William P.; King, Terance M.; and Guzzetta, Joseph A., 4,040,532, Cl. 214-152.000.
Pearne, Frank S.; Pearne, Florentin J.; Osborn, William P.; King, Terance M.; and Guzzetta, Joseph A., to Aircraft Mechanics, Inc. Brick handling system. 4,040,532, Cl. 214-152.000.
Pease, Wilder F.: *See—*
Lamberti, Vincent; and Pease, Wilder F., 4,040,781, Cl. 8-137.000.
Pecherer, Benjamin: *See—*
Avenia, Richard William; Christenson, James Gordon; and Pecherer, Benjamin, 4,041,076, Cl. 260-559.00A.
Pecoraro, George A.; and Bayne, Richard L., to PPG Industries, Inc. Glazed refractory support for delivering glass to a forming chamber. 4,040,809, Cl. 65-182.00R.
Pederzini, Renzo: *See—*
Bardotti, Angelo; and Pederzini, Renzo, 4,041,473, Cl. 364-900.000.
Pedigree Petfoods Limited: *See—*
Burrows, Ian Edward; Cheney, Peter Arthur; and Ariss, Stephen Arthur, 4,041,181, Cl. 426-55.000.
Peer, Thomas Richard: *See—*
Kahan, William; Rupinski, Fredrick Alexander; Wagner, John Francis; and Peer, Thomas Richard, 4,040,277, Cl. 66-154.00A.
Pejouhy, Radi: *See—*
Yarworth, Norman; and Pejouhy, Radi, 4,041,432, Cl. 337-111.000.
Pelchat, Paul F., to General Motors Corporation. Key illuminating door handle. 4,041,301, Cl. 240-2.130.
Pellegata, Renato: *See—*
Gandolfi, Carmelo; Doria, Gianfederico; Pellegata, Renato; and Usardi, Maria M., 4,041,064, Cl. 560-121.000.
Penczak, John P., to Bargar Metal Fabricating Company. Preset housing for electrical distribution systems. 4,041,238, Cl. 174-48.000.
Penfold, Alan S.; and Thornton, John A., to Telic Corporation. Glow discharge method and apparatus. 4,041,353, Cl. 315-267.000.
Penton, Hugh V.; Dunphy, Gerald P.; and Stevens, Clayton O. Changeable message sign construction. 4,040,194, Cl. 40-142.00A.
Pentron Industries, Inc.: *See—*
Shidel, Jerome E.; and Sampey, Harry R., 4,041,285, Cl. 235-150.270.
Penzes, Joyce P. Variable-density vehicle glare shield. 4,040,657, Cl. 296-97.00R.
Peoples, Patrick J.: *See—*
Villaume, Henry F.; Collins, D. Stephen; and Peoples, Patrick J., 4,040,743, Cl. 356-73.000.
Perez, Jose Miguel. Athletic training shoe. 4,040,192, Cl. 36-108.000.
Perkin-Elmer Limited: *See—*
Swift, David William, 4,040,741, Cl. 356-28.000.
Perma Rain Irrigation, Inc.: *See—*
Williams, Maurice Charles, 4,040,670, Cl. 301-5.300.
Perren, Stephan M.: *See—*
Steinemann, Samuel G.; and Perren, Stephan M., 4,040,129, Cl. 3-1.900.
Perrotta, Anthony J.: *See—*
Innes, Robert A.; and Perrotta, Anthony J., 4,040,983, Cl. 252-469.000.
Perry, John H.; Salsburg, David S.; and Taylor, Colin R., to Pfizer Inc. Method and system for analysis of ambulatory electrocardiographic tape recordings. 4,041,468, Cl. 364-900.000.
Perryman, Ralph: *See—*
Main, James; Moss, Leslie Robert; and Perryman, Ralph, 4,040,280, Cl. 70-333.00R.
Persinski, Leonard J.; Martin, Fred David; and Adams, Sally Lee, to Calgon Corporation. Methods of using cementing compositions having improved flow properties, containing phosphonobutane tricarboxylic acid. 4,040,854, Cl. 106-90.000.
Personal Communications, Inc.: *See—*
Yevick, George Johannus, 4,041,114, Cl. 264-1.000.
Pertec Corporation: *See—*
Jennings, Alan K., 4,041,469, Cl. 364-900.000.
Pessel, Kurt; and Stodt, Eberhard, to Lindemann Maschinenfabrik GmbH. Method for filling containers with compressed blocks of garbage. 4,040,230, Cl. 53-24.000.
Peter Eckrich and Sons, Inc.: *See—*
Hutchins, Kenneth A., 4,040,528, Cl. 214-16.40A.
Peter, Heinrich: *See—*
Kocsis, Karoly; Peter, Heinrich; and Bickel, Hans, 4,041,161, Cl. 424-246.000.
Peters, Walter A.; Hozian, Curtis A.; and Gusek, Richard W., to Gard, Inc. Stamp vending machine. 4,040,510, Cl. 194-2.000.
Petersen, Harro: *See—*
Schoeppl, Hubert; Petersen, Harro; Paulus, Gerhard; and Queins, Hubertus, 4,041,222, Cl. 526-6.000.
Peterson, Edward W.; and Bednar, Charles J., to Arctic Enterprises, Inc. Galley unit. 4,040,693, Cl. 312-236.000.
Petricciani, John C.; Hopps, Hope E.; Lorenz, Douglas E.; Vasington, Paul J.; and Wallace, Roslyn E., to United States of America, Government. Sub-human primate diploid cell lines as substrates for virus vaccine production. 4,040,905, Cl. 195-1.800.
Petrolite Corporation: *See—*
Heintzelman, William J.; and Naiman, Michael I., 4,041,056, Cl. 260-404.500.
Lissant, Kenneth J., 4,040,857, Cl. 106-243.000.
Oberton, Serafin Bess, 4,040,926, Cl. 204-186.000.
Oude Alink, Bernardus A.; Thompson, Neil E. S.; and Hutton, Ronald P., 4,040,799, Cl. 44-75.000.
Wilson, Homer M., 4,040,931, Cl. 204-195.00C.
Petroski, Alex: *See—*
Taylor, Lauren P.; and Petroski, Alex, 4,040,960, Cl. 210-96.00R.
Petrus, Stephen, to Eaton Corporation. Fastener. 4,040,463, Cl. 151-41.750.
Pews, R. Garth: *See—*
Goralski, Christian T.; Pews, R. Garth; and Burk, George A., 4,041,073, Cl. 260-556.0AR.
Pfarrer, David M.; and Parker, Sidney A., to Lennox Industries, Inc. Control apparatus for two-speed compressor. 4,041,542, Cl. 361-27.000.
Pfeil, Erhard: *See—*
Kullmann, Rolf; and Pfeil, Erhard, 4,040,609, Cl. 266-143.000.
Pfizer Inc.: *See—*
Bindra, Jasjit S.; and Kadin, Saul B., 4,041,163, Cl. 424-251.000.
Perry, John H.; Salsburg, David S.; and Taylor, Colin R., 4,041,468, Cl. 364-900.000.
PGP Industries, Inc.: *See—*
Baltz, John; and Coltrinari, Enzo, 4,041,126, Cl. 423-22.000.
Phifer, Earl Cooper: *See—*
Howard, James Lynn, 4,041,383, Cl. 324-66.000.
Philagro: *See—*
Abblard, Jean; Marmain, Georges; and Viricel, Andree, 4,041,109, Cl. 260-927.00R.
Philippon, Raymond C., to Societe Anonyme dite: Etude et Realisation de Chaines Automatiques - ERCA. Process and installation for packing a liquid pasty, or granular product and a packing container. 4,040,561, Cl. 229-43.000.
Philips-Duphar B.V.: *See—*
van der Veek, Augustinus Petrus Maria, 4,041,145, Cl. 424-1.000.
Phillips Petroleum Company: *See—*
Hatcher, Charles S.; and Atchley, Gary S., 4,040,153, Cl. 28-221.000.
Hessert, James E., 4,040,484, Cl. 166-294.000.
Hughes, James K.; and Erickson, Wayne K., 4,040,155, Cl. 28-248.000.
Hutson, Thomas, Jr., 4,041,099, Cl. 260-683.300.
Uraneck, Carl A.; and Solomon, Paul W., 4,041,227, Cl. 526-190.000.
Zahn, Carl W.; and Clayton, Hadwen A., 4,040,259, Cl. 62-37.000.
Picker Corporation: *See—*
Amor, William H., Jr.; and Steffek, Robert J., 4,041,320, Cl. 250-523.000.
Pickles, Joseph, to Ferro Manufacturing Corporation. Power seat mechanism. 4,040,591, Cl. 248-394.000.
Pielsticker, Klaus Peter; Mogendorf, Friedel; and Sonnabend, Karl Heinrich, to Schloemann-Siemag-Aktiengesellschaft of Duesseldorf. Lifting beam cooling and conveying bed. 4,040,514, Cl. 198-774.000.
Pierce, Robert M.: *See—*
Mosier, Stanley A.; and Pierce, Robert M., 4,040,252, Cl. 60-39.360.
Pierson, Fred W., Jr.: *See—*
Pierson, Fred W., Sr.; Pierson, Fred W., Jr.; and Weidenfeller, Gordon J., 4,040,597, Cl. 249-134.000.
Pierson, Fred W., Sr.; Pierson, Fred W., Jr.; and Weidenfeller, Gordon J., to M&T Mfg. Co. Core holding structure for molds. 4,040,597, Cl. 249-134.000.
Pifferi, Giorgio; Omodei-Sale', Amedeo; and Consonni, Pietro, to Gruppo Lepetit S.p.A. 3,2-Benzoxazepine derivatives. 4,041,048, Cl. 260-333.000.
Pinkel, Edward B.: *See—*
Englander, Harlan P.; and Pinkel, Edward B., 4,040,898, Cl. 159-27.00R.
Pisano, John J., to GTE Sylvania Incorporated. Cathode ray tube base. 4,040,707, Cl. 339-111.000.
Pissiotas, Georg: *See—*
Boger, Manfred; Drabek, Joseph; and Pissiotas, Georg, 4,040,811, Cl. 71-78.000.
Pitney-Bowes, Inc.: *See—*
Orlens, Alfreds; and Hubbard, David W., 4,040,346, Cl. 101-336.000.
Pittler, Marvin S.: *See—*
Chang, Kenneth; and Pittler, Marvin S., 4,040,891, Cl. 156-651.000.
Pittsburgh Environmental and Energy Systems, Inc.: *See—*
Bramer, Henry C.; and Shapiro, Edward, 4,041,128, Cl. 423-213.200.
Platt, James L.; and Schinski, William L., to Chevron Research Company. Nematocidal 4-amino-N-thio-substituted 3,5-dinitrobenzenesulfonamides. 4,041,159, Cl. 424-228.000.

Platte, Friedrich: *See—*
Wiedemann, Wolfgang; and Platte, Friedrich, 4,040,570, Cl. 241-3.000.
Plessey Handel und Investments AG.: *See—*
Arnold, John Spencer, 4,041,464, Cl. 364-200.000.
Wisdom, Graham John; Creteau, Peter Verne; and Williams, John Lloyd, 4,041,460, Cl. 364-900.000.
Plows, Graham Stuart; and Edge, Gordon Malcolm, to Decca Limited of Decca House. Method of recording wide-band signals on a thermoplastic film by use of a beam of electrons. 4,041,532, Cl. 358-128.000.
Plumadore, John D., to A. B. Dick/Scott. Apparatus for electrostatically charging an electrophotographic film. 4,041,312, Cl. 250-315.00R.
Plysu Limited: *See—*
Taylor, Robert W., 4,040,552, Cl. 225-1.000.
Pogson, John T.; and Streck, Donald A., to Boeing Company, The. External tube artery flexible heat pipe. 4,040,478, Cl. 165-105.000.
Pohl, Ulrich: *See—*
Altenhoner, Klaus; Jansen, Walter; Knop, Klaus; Pohl, Ulrich; and Reerink, Jan G., 4,040,816, Cl. 75-35.000.
Polaroid Corporation: *See—*
Baker, Philip G.; and Johnson, Bruce K., 4,040,751, Cl. 356-225.000.
Bloom, Stanley M., 4,040,832, Cl. 96-29.00R.
Johnson, Bruce K., 4,041,514, Cl. 354-288.000.
Rogers, Howard G., 4,040,830, Cl. 96-73.000.
Pollitt, John Michael: *See—*
Giffen, William McAlpin; Pollitt, John Michael; and Clifford, Roy, 4,040,645, Cl. 280-745.000.
Polukhin, Vladimir Nikolaevich: *See—*
Polukhina, Ljudmila Alexeevna; Polukhin, Vladimir Nikolaevich; and Kochetkova, Anna Georgievna, 4,041,375, Cl. 324-32.000.
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Polva Nederland,BV: *See—*
Acda, Petrus Marinus, 4,040,889, Cl. 156-498.000.
Polyakova, Victoria Petrovna: *See—*
Smirnov, Viktor Sergeevich; Gryaznov, Vladimir Mikhailovich; Lebedeva, Valentina Ivanovna; Mischenko, Alexandr Petrovich; Polyakova, Victoria Petrovna; and Savitsky, Evgeny Mikhailovich, 4,041,093, Cl. 260-673.500.
Pond, David Martin; and Wang, Richard Hsu-Shien, to Eastman Kodak Company. Benzotriazole ortho-ester ultraviolet stabilizers. 4,041,011, Cl. 260-45.8NT.
Pope, Isaac Louis. Dieting game board apparatus. 4,040,628, Cl. 273-134.00B.
Porat, Eli, to Intel Corporation. High speed input buffer circuit. 4,041,333, Cl. 307-279.000.
Porcham, Wolfgang, to D. Swarovski & Co. Method of treating the fluorine-containing mud produced by the acid polishing of lead glass so as to form basic lead carbonate. 4,041,127, Cl. 423-92.000.
Post Office, The: *See—*
Midwinter, John Edwin; and Day, Clive Richard, 4,040,807, Cl. 65-3.00A.
Potier, Pierre Roger; and Sota, Tadamichi, to Foseco International Limited. Casting of molten metals. 4,040,469, Cl. 164-56.000.
Potter, Roy F.; and Stierwalt, Donald L., to United States of America, Navy. Emittance calorimetric method. 4,041,313, Cl. 250-341.000.
Poulsen, Harold W., to UOP Inc. Solar heat-light recovery system. 4,041,318, Cl. 250-459.000.
Poulsen, Peder Ulrik. Mechanism for transformation of a rotary motion into a translatory motion or vice versa. 4,040,682, Cl. 308-176.000.
Powell, Charles G.: *See—*
Powell, Kenneth W., 4,040,239, Cl. 54-80.000.
Powell, Kenneth W., to Powell, Charles G., a part interest. Protective headgear for horses. 4,040,239, Cl. 54-80.000.
Powers, Larry J.: *See—*
Moser, Robert E.; Powers, Larry J.; and Ariyan, Zaven S., 4,041,167, Cl. 424-270.000.
PPG Industries, Inc.: *See—*
Hoekje, Howard H.; Carlson, Gordon A.; and Simmons, Robert B., 4,040,934, Cl. 204-256.000.
Johnson, Harlan B.; Martinsons, Aleksandrs; and Snodgrass, John O., 4,040,918, Cl. 204-98.000.
Jones, James E., 4,040,924, Cl. 204-181.000.
Lattner, Elmer A., 4,040,384, Cl. 118-120.000.
Makhlouf, Joseph M.; and Parker, Earl E., 4,041,008, Cl. 260-40.00R.
Pecoraro, George A.; and Bayne, Richard L., 4,040,809, Cl. 65-182.00R.
Seeger, Nelson V.; and Kaman, Andrew J., 4,041,208, Cl. 428-424.000.
Soska, Frank A.; and Shumaker, Lyle L., 4,040,888, Cl. 156-497.000.
Prater, Charles Dwight: *See—*
Kuo, James C.; Prater, Charles Dwight; and Wise, John J., 4,041,094, Cl. 260-676.00R.
Precision Metalsmiths, Inc.: *See—*
Horton, Robert A.; and Bauer, Timothy R., 4,040,466, Cl. 164-17.000.
Presley, C. Travis: *See—*
Argabright, Perry A.; and Presley, C. Travis, 4,040,258, Cl. 61-36.00C.
Prochazka, Svante, to General Electric Company. Silicon carbide sintered body. 4,041,117, Cl. 264-63.000.
Procter & Gamble Company, The: *See—*
Benson, Richard W.; Cherney, Steven D.; and Collier, Everett J., 4,040,988, Cl. 252-532.000.
Production Specialties, Inc.: *See—*
Coussan, Sidney G., 4,040,481, Cl. 166-214.000.
Pryke, David Speaight, to Pynford Limited. Pile with downwardly extending elongated elements. 4,040,260, Cl. 61-53.620.
Pulciani, Sam C.: *See—*
Ostrem, Obert M.; Kulikowski, Donald F.; and Pulciani, Sam C., 4,040,540, Cl. 220-273.000.
Pullukat, Thomas J., to Chemplex Company. Polymerization catalyst and method. 4,041,225, Cl. 526-96.000.
Pullukat, Thomas J.: *See—*
Hoff, Raymond E.; Pullukat, Thomas J.; and Shida, Mitsuzo, 4,041,224, Cl. 526-96.000.
Purdue Research Foundation: *See—*
Kelly, Susan J.; and Butler, Larry G., 4,041,111, Cl. 260-954.000.
Pynford Limited: *See—*
Pryke, David Speaight, 4,040,260, Cl. 61-53.620.
Quarrie, Eugene A. Educational game. 4,040,191, Cl. 35-1.000.
Queins, Hubertus: *See—*
Schoeppl, Hubert; Petersen, Harro; Paulus, Gerhard; and Queins, Hubertus, 4,041,222, Cl. 526-6.000.
Quick, James R.; and Wittosch, William A., Jr., to International Paper Company. Process for molding of hollow articles. 4,041,122, Cl. 264-277.000.
R. P. Scherer Corporation: *See—*
Schwarz, Erwin, 4,040,536, Cl. 220-8.000.
Rady-Pentek, Arthur A.; and Fairweather, Edwin William. Manufacture of lightweight concrete. 4,040,855, Cl. 106-90.000.
Rahn, LeRoy W. Piggyback tractor powered roller. 4,040,761, Cl. 404-86.000.
Rains, Randall C.: *See—*
McGraw, Philip W.; Doorakian, George A.; and Rains, Randall C., 4,041,019, Cl. 260-75.0NC.
Rajput, Yudh Vir, to B. F. Goodrich Company, The. Anti-skid brake control system with short circuit protection. 4,040,676, Cl. 303-92.000.
Ralph M. Parsons Company, The: *See—*
Mackles, Mark, 4,041,130, Cl. 423-220.000.
Ralph Ogden: *See—*
Enoksen, Gerald E., 4,041,431, Cl. 336-160.000.
Rambold, Wolfgang: *See—*
Mansmann, Manfred; and Rambold, Wolfgang, 4,040,860, Cl. 106-302.000.
Rammler, Roland, to Metallgesellschaft Aktiengesellschaft. Process for separating solids from high-boiling hydrocarbons in a plurality of separation stages. 4,040,958, Cl. 210-73.00R.
Ramsay, Donald C.; and Tantillo, James M., to Component Manufacturing Service, Inc. Electrical connector. 4,040,697, Cl. 339-61.00R.
Ramsey Corporation: *See—*
McCormick, Harold E., 4,040,637, Cl. 277-224.000.
Ranger Engineering Corporation: *See—*
Sturgeon, Clayton L., 4,041,411, Cl. 330-207.00A.
Rank Xerox Ltd.: *See—*
Kurosaki, Takefumi, 4,040,615, Cl. 271-63.000.
Ranks Hovis McDougall Limited: *See—*
Towersey, Peter John; Longton, John; and Cockram, Geoffrey Norman, 4,041,189, Cl. 426-656.000.
Raptis, George M. Fishing line sinker assembly. 4,040,199, Cl. 43-43.140.
Raschle, Josef, to Heberlein Maschinenfabrik AG. Twist tube for false-twisting devices. 4,040,242, Cl. 57-77.300.
Raschle, Josef, to Heberlein Maschinenfabrik AG. Apparatus for false-twist texturing of textile yarns. 4,040,244, Cl. 57-77.450.
Rasmussen, Harry R., to Crest Industries, Inc. Female connector and escutcheon plate combined therewith for telephone equipment. 4,040,699, Cl. 339-91.00R.
Ratajczak, Anthony F.: *See—*
Forestieri, Americo F.; Ratajczak, Anthony F.; and Sidorak, Leroy G., 4,040,867, Cl. 136-89.00P.
Rauch, David: *See—*
Vincent, George C.; and Rauch, David, 4,040,796, Cl. 44-14.000.
Rayburn, Gerald A.: *See—*
Schlanert, George A.; Wood, Lorin A.; and Rayburn, Gerald A., 4,040,581, Cl. 244-83.00K.
Raymond Lee Organization, Inc., The: *See—*
Fitzpatrick, Richard L., 4,040,521, Cl. 211-24.000.
Hill, Andrew Joseph, 4,040,545, Cl. 223-85.000.
Masterfield, Clarence William, 4,041,529, Cl. 358-109.000.
Sinnott, Vernon J., 4,040,622, Cl. 273-86.00R.
Wiley, Kenneth, 4,040,593, Cl. 248-489.000.
Raynaud, Guy M.: *See—*
Fauran, Claude P.; Bourgery, Guy R.; Raynaud, Guy M.; and Gouret, Claude J., 4,041,030, Cl. 544-117.000.
Rayner, Bruce Leland; and Taylor, Gerald Graham, to Grass Valley Group, Inc., The. Video effects generator. 4,041,527, Cl. 358-22.000.
Raytheon Company: *See—*
Whitehouse, David R.; and Hartshorn, David W., 4,041,351, Cl. 315-205.000.
RCA Corporation: *See—*
Arnoldi, Hugh; and Salvatore, Leonard Robert, 4,041,388, Cl. 324-158.00T.
Bingham, Joseph Peter, 4,041,531, Cl. 358-37.000.

Catanese, Carmen Anthony; and Keneman, Scott Allen, 4,041,342, Cl. 313-105.00R.
Chang, Kern Ko Nan, 4,041,515, Cl. 357-13.000.
Clark, Charles Albert, Jr., 4,041,357, Cl. 361-6.000.
Deal, Samuel Broughton; and Bartch, Donald Walter, 4,041,347, Cl. 313-450.000.
Frankowski, Richard Edward Bronislaw, 4,041,374, Cl. 324-20.0CR.
Haferl, Peter Eduard, 4,041,354, Cl. 315-371.000.
Huang, Ho-Chung, 4,040,168, Cl. 29-571.000.
Hussain, Mohammed Imam, 4,041,486, Cl. 343-7.300.
Leedom, Marvin Allan, 4,040,634, Cl. 274-2.000.
Leedom, Marvin Allan, 4,040,635, Cl. 274-37.000.
Napoli, Louis Sebastian; and Marx, Richard Everet, 4,041,307, Cl. 250-203.00R.
Trotnick, Vincent William, Jr., 4,041,408, Cl. 330-15.000.

Reber, Jean-Francois: *See—*
Steiger, Rolf; Reber, Jean-Francois; Ezekiel, Aaron David; and Ficken, Geoffrey Ernest, 4,040,825, Cl. 96-1.700.

RecTech, Inc.: *See—*
Ort, Jay E., 4,040,953, Cl. 210-6.000.

Reed, Roger R., to Cadec Systems, Inc. Vehicle voice data link. 4,041,393, Cl. 325-54.000.

Reeg, Cloyd P.: *See—*
Kelley, Arnold E.; Reeg, Cloyd P.; Wood, Frederick C.; and Cheadle, George D., 4,040,944, Cl. 208-89.000.

Reerink, Jan G.: *See—*
Altenhoner, Klaus; Jansen, Walter; Knop, Klaus; Pohl, Ulrich; and Reerink, Jan G., 4,040,816, Cl. 75-35.000.

Refractory Services International Limited: *See—*
Black, William Brown, 4,040,778, Cl. 432-192.000.

Regan, Robert J.: *See—*
McNeill, William H.; Haugsjaa, Paul O.; Lech, Joseph; and Regan, Robert J., 4,041,352, Cl. 315-248.000.

Regie Nationale des Usines Renault: *See—*
Leichle, Claude, 4,040,397, Cl. 123-32.0AE.

Rehkopf, Charles H.: *See—*
Neuber, Ralph E.; and Rehkopf, Charles H., 4,040,708, Cl. 339-111.000.

Reichel, Kurt: *See—*
Decker, Gerd; Steinke, Dieter; and Reichel, Kurt, 4,040,393, Cl. 123-30.00A.

Reichenberger, Roland: *See—*
Johne, Hans; Jentzsch, Arndt; Schumann, Gunter; Reichenberger, Roland; Kesselring, Horst; and Fischer, Karl-Heinz, 4,040,347, Cl. 101-349.000.

Reichert, Hartmut: *See—*
Michel, Wilfried; Reichert, Hartmut; and Willmann, Erich, 4,041,503, Cl. 346-83.000.

Reinhardt, James R.: *See—*
Carle, Ross G.; and Reinhardt, James R., 4,040,523, Cl. 213-46.00R.

Reis, Richard M., Sr.: *See—*
Zimmerman, John E.; and Reis, Richard M., Sr., 4,040,278, Cl. 69-42.000.

Reise, Herman A. Automatic trailer sway sensing and brake applying system. 4,040,507, Cl. 188-112.000.

Reist, Jurg: *See—*
Henych, Ivo; Fischer, Erwin; and Reist, Jurg, 4,040,596, Cl. 249-117.000.

Reiszner, Kenneth D.: *See—*
Nelms, Leonard H.; Reiszner, Kenneth D.; and West, Philip W., 4,040,805, Cl. 55-158.000.

Renaud, Jean; and Narcy, Jean-Paul, to Colgate-Palmolive Company. Liquid detergent. 4,040,989, Cl. 252-548.000.

Renold Limited: *See—*
Foster, Kenneth William Samuel, 4,040,337, Cl. 91-491.000.

Repay, Laszlo N.: *See—*
Freimark, Ronald J.; and Repay, Laszlo N., 4,041,498, Cl. 343-749.000.

Research-Cottrel, Inc.: *See—*
Scheller, Herman, 4,040,774, Cl. 425-65.000.

Research Engineering & Manufacturing, Inc.: *See—*
Muenchinger, Herman G., 4,040,328, Cl. 85-46.000.

Revco, Inc.: *See—*
Vermes, Roy E.; and Cosby, Richard E., 4,040,618, Cl. 271-182.000.

Rhoades, Donald M.: *See—*
Wilson, John J.; and Rhoades, Donald M., 4,040,338, Cl. 92-106.000.

Rhodia, Inc.: *See—*
Gradeff, Peter S.; and Formica, Giuseppe, 4,041,083, Cl. 260-617.00C.

Riblet, Henry J. Shunted stepped waveguide transition. 4,041,420, Cl. 333-35.000.

Ricard, Jacques, to Cibie Projecteurs. Vehicle headlamps. 4,041,303, Cl. 240-41.40R.

Rich, Joseph A., to General Electric Company. High current capacity rod array vacuum arc discharge device. 4,041,261, Cl. 200-144.00B.

Richards, Lawrence M., to Atlantic Richfield Company. Storage of radioactive material. 4,040,480, Cl. 166-57.000.

Richardson, James E.: *See—*
Mason, Stanley I., Jr.; Handler, Michael D.; and Richardson, James E., 4,040,568, Cl. 239-57.000.

Richardson, Martin C.; and Leopold, Kurt, to Canadian Patents and Development Limited. Multiple arc radiation preionizer for gas lasers. 4,041,414, Cl. 331-94.50G.

Richardson-Merrell Inc.: *See—*
Shemano, Irving, 4,041,165, Cl. 424-267.000.

Richerson, David W.; and Schuyler, Donald R., II, to Garrett Corporation, The. Ceramic composition and crucibles and molds formed therefrom. 4,040,845, Cl. 106-38.900.

Richmond, Raymond; Parmer, Edward; and Parmer, Edward G., Jr. Anti-theft vehicle brake-supervising device. 4,040,675, Cl. 303-89.000.

Ricoh Company, Ltd.: *See—*
Satomi, Toyokazu, 4,040,733, Cl. 355-8.000.

Riebel, Hans-Jochem: *See—*
Maurer, Fritz; Riebel, Hans-Jochem; Hammann, Ingeborg; and Stendel, Wilhelm, 4,041,158, Cl. 424-212.000.

Riecke, Raymond E. Trailer hitch cover. 4,040,641, Cl. 280-507.000.

Rieger, Klaus R.: *See—*
Campbell, Bonnie J.; and Rieger, Klaus R., 4,040,479, Cl. 165-133.000.

Riley, Myrne Rodney, to Rohm and Haas Company. Jet texturing process and apparatus. 4,040,154, Cl. 28-273.000.

Riner, Victor: *See—*
Juillard, Yves; and Riner, Victor, 4,040,453, Cl. 139-446.000.

Riso, Vladimir: *See—*
Dauby, Alain; Riso, Vladimir; and Roger-Rodes, Daniel, 4,041,296, Cl. 235-164.000.

Rist's Wires & Cables Limited: *See—*
Amphlett, Robert, 4,040,178, Cl. 29-745.000.

Rittenbach, Otto: *See—*
Fishbein, William; and Rittenbach, Otto, 4,041,488, Cl. 343-8.000.

Ritter, Edward H.: *See—*
Schertz, Charles W.; and Ritter, Edward H., 4,040,744, Cl. 356-152.000.

River Range Developments Limited: *See—*
Pate, Ronald W., 4,041,394, Cl. 325-102.000.

Roband Electronics Limited: *See—*
Gold, Bernard Samuel; and Smithers, Peter Alan, 4,041,367, Cl. 363-97.000.

Robarge, Wilbur A., to General Motors Corporation. Tape head shift apparatus for multi-track tape player. 4,041,539, Cl. 360-106.000.

Robbins, Daniel T., to Robbins, Danny Joel; and Brown, Stanley M. Automatic fishing pole holder. 4,040,197, Cl. 43-15.000.

Robbins, Danny Joel: *See—*
Robbins, Daniel T., 4,040,197, Cl. 43-15.000.

Robert Bosch GmbH: *See—*
Handtmann, Dieter; and Lavanchy, Jean-Pierre, 4,040,740, Cl. 356-4.000.
Heine, Joseph, 4,040,407, Cl. 123-146.50A.
Knapp, Heinrich, 4,040,569, Cl. 239-467.000.
Kraus, Bernd; and Glockler, Otto, 4,040,408, Cl. 123-179.00L.
Lietar, Christian, 4,040,746, Cl. 356-168.000.
Romann, Peter, 4,040,295, Cl. 73-228.000.
Wahl, Josef; Schmidt, Peter Jurgen; and Zechnall, Richard, 4,040,394, Cl. 123-32.0EA.

Roberts, Cecil P.: *See—*
Siler, Harold L., Jr.; and Roberts, Cecil P., 4,040,236, Cl. 53-67.000.

Roberts, Daniel M.: *See—*
Beaven, Herbert R., Jr.; and Roberts, Daniel M., 4,040,511, Cl. 197-133.00R.

Roberts Industries, Inc.: *See—*
Applequist, Quintin A.; and Hawley, Laird V., 4,040,643, Cl. 280-656.000.

Roberts, John A.: *See—*
Orth, Edward D.; Roberts, John A.; and Smith, Raymond J. D., 4,040,936, Cl. 204-271.000.

Robertson, Peter Murday. Electrode arrangement for electrochemical cells. 4,040,938, Cl. 204-283.000.

Robinson, Barry J., to Fairchild Camera and Instrument Corporation. High speed complementary output exclusive OR/NOR circuit. 4,041,326, Cl. 307-216.000.

Roblin Industries, Inc.: *See—*
Sauer, Gale E., 4,040,758, Cl. 403-397.000.

Rockwell International Corporation: *See—*
Beaven, Herbert R., Jr.; and Roberts, Daniel M., 4,040,511, Cl. 197-133.00R.
Groff, Alvin H., 4,041,483, Cl. 340-347.00P.
Ketchpel, Richard D., 4,040,727, Cl. 350-288.000.
Molina, Orlando G., 4,041,310, Cl. 250-302.000.
Spence, John R.; and Kinney, Bruce W., Jr., 4,041,330, Cl. 307-251.000.
York, Paul K., 4,040,720, Cl. 350-160.0LC.

Rockwell-Rimoldi S.p.A.: *See—*
Marforio, Nerino, 4,040,370, Cl. 112-299.000.

Rodot, Huguette Fumeron; Schneider, Maurice; and Hruby, Arnost. Process of preparing crystals of compounds and alloys. 4,040,894, Cl. 156-609.000.

Rodseth, William G.: *See—*
Lasier, Thomas R.; Rodseth, William G.; and Schnarr, Raymond H., 4,040,143, Cl. 16-48.00J.

Roebke, Wolfgang; Kneitel, Dieter; and Parr, Erfried, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler; and Henkel & Cie GmbH. Ion-exchanging aluminum silicate with hydrophilic surfaces. 4,040,972, Cl. 252-179.000.

Roger-Rodes, Daniel: *See—*
Dauby, Alain; Riso, Vladimir; and Roger-Rodes, Daniel, 4,041,296, Cl. 235-164.000.

Rogers, Howard G., to Polaroid Corporation. Photographic products comprising embossed supports. 4,040,830, Cl. 96-73.000.

Rogers, Wilford P., to TRW Inc. Ball retainer for ball bearings. 4,040,687, Cl. 308-201.000.

Rognon, Armand. Control device sensitive to speeds in excess of a pre-determined rotation speed. 4,040,301, Cl. 74-3.000.

Rohm and Haas Company: *See—*
Clovis, James S.; Dohling, Jerome; and Nicastro, Francis J., 4,040,913, Cl. 203-69.000.
Clovis, James S.; and Sullivan, Francis R., 4,041,107, Cl. 260-876.00R.
Fong, Ronald A.; Latty, James A.; and McDonnell, Roger P., 4,041,006, Cl. 260-33.6UA.
Kuhn, Robert R.; and Machleder, Warren H., 4,040,798, Cl. 44-71.000.
Neely, James W., 4,040,990, Cl. 260-2.10R.
Riley, Myrne Rodney, 4,040,154, Cl. 28-273.000.

Rohrer, John F.: *See—*
Lewis, Morton; and Rohrer, John F., 4,040,994, Cl. 260-18.0PF.

Rohrig, Josef: *See—*
Konig, Justus; and Rohrig, Josef, 4,041,245, Cl. 179-18.0AB.

Rollins, Dallas W.: *See—*
Walk, Howard J.; and Rollins, Dallas W., 4,040,363, Cl. 105-377.000.

Rollojay, Francisco R.: *See—*
Ortiz, Nilson V., 4,040,698, Cl. 339-75.00P.

Rolt, Anthony P. R.; Walker, Frederick J.; and Webb, Oswald, to Harry Ferguson Limited; and GKN Transmissions Limited. Viscous shear couplings. 4,040,271, Cl. 64-26.000.

Rom-Amer Pharmaceuticals, Ltd.: *See—*
Sapse, Alfred T., 4,041,174, Cl. 424-310.000.

Roman, Steven A., to Shell Oil Company. Insecticidal oxime derivatives. 4,041,027, Cl. 542-400.000.

Romann, Peter, to Robert Bosch GmbH. Air intake flowmeter for internal combustion engines. 4,040,295, Cl. 73-228.000.

Ronson Corporation: *See—*
Brooks, Donald Leslie William, 4,040,541, Cl. 220-339.000.

Rose, Ralph E., to Watkins-Johnson Co.; and Signetics Corporation. Method of fabricating an array of semiconductor devices. 4,040,169, Cl. 29-577.000.

Rose, William Lester; and Johnson, Herbert Joe. Air-fuel mixture control system. 4,040,403, Cl. 123-133.000.

Rosenbaum, James E. Animal grooming tool. 4,040,390, Cl. 119-86.000.

Rosolowski, Joseph H.: *See—*
Greskovich, Charles D.; and Rosolowski, Joseph H., 4,040,848, Cl. 106-73.500.
Greskovich, Charles D.; and Rosolowski, Joseph H., 4,040,849, Cl. 106-73.500.

Rossell, John Barry: *See—*
Cottier, Derek; and Rossell, John Barry, 4,041,188, Cl. 426-607.000.

Rossey, Guy: *See—*
Ghosez, Leon; Rossey, Guy; and Didderen, Freddy, 4,041,077, Cl. 260-562.00R.

Rossler, Frederick William, Jr.: *See—*
Dola, Frank Peter; and Rossler, Frederick William, Jr., 4,040,709, Cl. 339-125.00L.

Rote, Everett A.; and Smith, Edward G., to Xerox Corporation. Bearing assembly. 4,040,678, Cl. 308-6.00R.

Roth, Roy William, to American Cyanamid Company. Medical sponges. 4,040,884, Cl. 156-209.000.

Rothenstein, Julius; and Zimmerman, G. A., to United States of America, Navy. Perchlorate sensitizing agent. 4,040,880, Cl. 149-76.000.

Rothschild, Arthur Louis, III: *See—*
Baxter, Robert Olin; and Rothschild, Arthur Louis, III, 4,040,526, Cl. 214-10.50D.

Rounds, Gerald L. Basic oxygen steel furnace and process. 4,040,819, Cl. 75-60.000.

Rowcliffe, Arthur F.: *See—*
Bleiberg, Melvin L.; Diamond, Sidney; Rowcliffe, Arthur F.; and Spitznagel, John A., 4,040,876, Cl. 148-37.000.

Rowe, Colin M., to U.S. Philips Corporation. Semiconductor device manufacture. 4,040,878, Cl. 148-188.000.

Roy, Alejo V.; and Heiwig, Jane R., to Dow Chemical Company, The. Urea determination of biological fluids using diacetylmonoxime reaction. 4,040,787, Cl. 23-230.00B.

Ruben, Murray A.: *See—*
McCormick, Joseph F., 4,040,445, Cl. 137-596.180.

Rubenstein, Kenneth E.: *See—*
Ullman, Edwin F.; and Rubenstein, Kenneth E., 4,040,907, Cl. 195-63.000.

Rubner, Roland; Kleeberg, Wolfgang; and Kuhn, Eberhard, to Siemens Aktiengesellschaft. Method for the preparation of relief structures. 4,040,831, Cl. 96-35.100.

Ruckensteiner, Kurt: *See—*
Binder, Walter; Hutter, Josef; Stich, Heinrich; Ruckensteiner, Kurt; Tines, Josef, deceased; Tines, Antonie, legal representative; and Schwarz, Heide, legal representative, 4,040,853, Cl. 106-103.000.

Rudman, Ronald H.: *See—*
Border, Robert O.; and Rudman, Ronald H., 4,040,332, Cl. 89-37.00F.

Rudolph, Paul; Bierbach, Herbert; Kupfer, Hans; Hafke, Carl; and Kohlen, Rudolf, to Metallgesellschaft Aktiengesellschaft. Reactor for gasifying solid fuels, particularly coal, under superatmospheric pressure. 4,040,800, Cl. 48-85.200.

Ruff, Donald O.: *See—*
King, Charles W.; Ruff, Donald O.; and Sheldrake, Leonard J., 4,041,369, Cl. 322-99.000.

Ruhrchemie Aktiengesellschaft: *See—*
Bexten, Ludger; Noeske, Heinz; Tummes, Hans; and Cornils, Boy, 4,041,081, Cl. 260-601.00R.
Gothel, Herbert; Cornils, Boy; Feichtinger, Hans; Tummes, Hans; and Falbe, Jurgen, 4,041,080, Cl. 260-585.00B.

Rumpf, Robert John: *See—*
Walker, Ronald Jay; Sherwin, Dewayne James; and Rumpf, Robert John, 4,040,576, Cl. 242-107.40A.

Rupert, Joseph Paul: *See—*
Wright, Alan C.; and Rupert, Joseph Paul, 4,040,974, Cl. 252-316.000.

Rupinski, Fredrick Alexander: *See—*
Kahan, William; Rupinski, Fredrick Alexander; Wagner, John Francis; and Peer, Thomas Richard, 4,040,277, Cl. 66-154.00A.

Rust, Rudolph. Apparatus for concentration of solar radiation. 4,040,411, Cl. 126-271.000.

Ryan, Dennis M., to Ampex Corporation. Tape guiding structure. 4,040,575, Cl. 242-76.000.

Ryozo Iijima: *See—*
Iijima, Ryozo; Matsubara, Yukio; Yamaguchi, Ginichi; and Fukushima, Masatoshi, 4,040,937, Cl. 204-281.000.

Rzeszewski, Theodore S.; Frantzis, Paul D.; and Sideris, Sotirios, to Matsushita Electric Corporation of America. Frequency synthesizer tuning system with signal seek control. 4,041,535, Cl. 358-191.000.

Sadler, Clyde John. Three in one car cup and holder. 4,040,549, Cl. 224-29.00G.

Sadowski, Edward Peter, to International Nickel Company, Inc., The. Maraging stainless steel welding electrode. 4,041,274, Cl. 219-137.0WM.

Safe Flight Instrument Corporation: *See—*
Greene, Leonard M., 4,040,374, Cl. 114-144.00C.

Sagawa, Akio: *See—*
Matsuda, Yasumasa; Kimura, Ichiro; Sagawa, Akio; and Hiramatsu, Tsutomu, 4,040,294, Cl. 73-117.300.

Sahni, Omesh, to International Business Machines Corporation. Blue color AC gas discharge display panel and method. 4,041,345, Cl. 313-225.000.

Saich, Anthony Michael: *See—*
Weiss, William Robert; Saich, Anthony Michael; and Cooksey, James Judson, 4,040,782, Cl. 28-271.000.

Saiki, Albert K.: *See—*
Gottschalk, Robert E.; and Saiki, Albert K., 4,040,587, Cl. 248-185.000.

Saint-Gobain Industries: *See—*
Melan, Giuseppe-Fabrizio Mario; and Nicoulaud, Jean Raymond, 4,040,572, Cl. 242-18.00A.

St. Joe Minerals Corporation: *See—*
Abramowitz, Philip Herbert; and Balliett, Robert Wayne, 4,040,286, Cl. 72-377.000.

Saitoh, Kozo; and Izumi, Sumio, to Mitsui Mining & Smelting Co., Ltd. Method for separation of mixture of polyester and cellulose derivative. 4,040,949, Cl. 209-166.000.

Sakai, Koichi: *See—*
Kikuchi, Yasuo; Ohmichi, Yasuyuki; Terasaki, Osamu; and Sakai, Koichi, 4,041,428, Cl. 335-210.000.

Sakakura, Takao: *See—*
Abe, Tatsuo; Okamoto, Toshiki; Sakakura, Takao; and Tateno, Tatsuo, 4,041,137, Cl. 423-489.000.

Sakamoto, Kenro; Fushiki, Isamu; and Koboshi, Sigeharu, to Konishiroku Photo Industry Co., Ltd. Photographic bleach-fixer. 4,040,837, Cl. 96-60.0BF.

Sakano, Toyoshi: *See—*
Yoshida, Hiroshi; Kozuka, Hajime; Sakano, Toyoshi; Honda, Yoichiro; and Omuro, Shojiro, 4,040,502, Cl. 180-149.000.

Sala Magnetics, Inc.: *See—*
Nolan, John J., 4,040,444, Cl. 137-561.00A.

Salin, Jean Claude, to Timex Corporation. Button cell configuration. 4,041,214, Cl. 429-98.000.

Salisbury, Ian David; and Ingram, Roy Edward, to ITT Industries, Incorporated. Hybrid circuit package. 4,041,548, Cl. 361-396.000.

Salsburg, David S.: *See—*
Perry, John H.; Salsburg, David S.; and Taylor, Colin R., 4,041,468, Cl. 364-900.000.

Salvatore, Leonard Robert: *See—*
Arnoldi, Hugh; and Salvatore, Leonard Robert, 4,041,388, Cl. 324-158.00T.

Salzer, Erwin: *See—*
Jacobs, Philip C., Jr.; and Salzer, Erwin, 4,041,434, Cl. 337-204.000.

Sammarcelli, Stanford M.: *See—*
Oliver, Ray J.; and Sammarcelli, Stanford M., 4,040,335, Cl. 84-183.000.

Sammons, Martin C.: *See—*
Bursey, Maurice M.; Hinton, Deborah M.; Sammons, Martin C.; and Wightman, R. Mark, 4,041,346, Cl. 313-336.000.

Sampey, Harry R.: *See—*
Shidel, Jerome E.; and Sampey, Harry R., 4,041,285, Cl. 235-150.270.

Samuel Moore & Company: *See—*
Stine, Clifford R.; Klipec, Bruce E.; and Herbert, William J., 4,041,237, Cl. 174-36.000.

Samuelsson, Bengt; and Magerlein, Barney J., to Upjohn Company, The. 4,5-Cis-didehydro-PGE_1 compounds. 4,041,066, Cl. 260-468.00D.

Sanchez, Miguel Ruiz, to AMP Incorporated. Apparatus for mating first and second portions of an electrical connector. 4,040,179, Cl. 29-749.000.

Sanford, Norman R., to Bendix Corporation, The. Method and apparatus for detecting characteristic features of surfaces. 4,041,286, Cl. 235-151.300.

Sanno, Yasushi: *See*—
Sugihara, Hirosada; Motohashi, Michio; Watanabe, Masazumi; Nishikawa, Masao; and Sanno, Yasushi, 4,041,079, Cl. 260-574.000.

Santucci, Nicola, to Nuovo Pignone S.p.A. Device for holding cut weft threads to be folded up into the shed to form a tucked selvedge in a fabric made by a shuttleless loom having a continuous weft supply mechanism. 4,040,452, Cl. 139-302.000.

Sapse, Alfred T., to Rom-Amer Pharmaceuticals, Ltd. Method of treating depression. 4,041,174, Cl. 424-310.000.

Sargent, Paul L.; and Ghezzo, Mario, to General Electric Company. Method of etching materials including a major constituent of tin oxide. 4,040,892, Cl. 156-659.000.

Sasaki, Koichi: *See*—
Washio, Takaji; Sasaki, Koichi; and Aizawa, Tatsuo, 4,040,387, Cl. 118-658.000.

Sass, Daniel B.; Earl, William A.; and Fasano, Joseph. Convertible multipurpose table. 4,040,692, Cl. 312-194.000.

Satake, Keigo: *See*—
Ohtsuka, Takaaki; Satake, Keigo; Yamazaki, Shiro; Hatakeyama, Nobuo; and Watanabe, Takeo, 4,041,170, Cl. 424-277.000.

Sato, Akira: *See*—
Hinata, Masanao; Takei, Haruo; Sato, Akira; Ikeda, Tadashi; and Iwamoto, Atsuo, 4,040,841, Cl. 96-126.000.
Matsuyama, Junichi; Hinata, Masanao; and Sato, Akira, 4,040,839, Cl. 96-64.000.

Sato, Hidetoshi: *See*—
Ohta, Kazuho; Matsuda, Fumio; Tanaka, Tsutomu; Ohnuki, Katsuhiro; Miyaji, Naotaka; and Sato, Hidetoshi, 4,041,256, Cl. 179-182.00R.

Sato, Masanobu, to Olympus Optical Co., Ltd. Coupling device for cassette tape recorder. 4,041,250, Cl. 179-100.110.

Sato, Shigeru: *See*—
Fukuzawa, Tadashi; Suzuki, Teruki; and Sato, Shigeru, 4,041,319, Cl. 250-460.000.

Sato, Takuya R. Bioelectrodes. 4,040,412, Cl. 128-2.06E.

Sato, Teruo, to Matsushita Electric Industrial Co., Ltd. Scanning apparatus for an electrophoretic matrix display panel. 4,041,481, Cl. 340-324.00M.

Sato, Yasushi: *See*—
Masaki, Katsumi; Hirayama, Kazuhiro; Sato, Yasushi; and Hirabayashi, Yoichi, 4,040,737, Cl. 355-49.000.

Satomi, Toyokazu, to Ricoh Company, Ltd. Variable magnification slitwise exposure process and apparatus therefor for use with electrophotographic copying machine. 4,040,733, Cl. 355-8.000.

Satomura, Masato: *See*—
Maekawa, Yukio; Satomura, Masato; and Umehara, Akira, 4,041,017, Cl. 260-47.0UA.

Satzinger, Gerhard; Herrmann, Manfred; and Vollmer, Karl-Otto, to Warner-Lambert Company. Method of producing diuresis using thiazolidinone acetic acid derivatives. 4,041,166, Cl. 424-267.000.

Saucy, Gabriel: *See*—
Cohen, Noal; and Saucy, Gabriel, 4,041,058, Cl. 260-410.90R.

Sauer, Gale E., to Roblin Industries, Inc. Suspended ceiling hanging clip. 4,040,758, Cl. 403-397.000.

Saunders, Arthur Frank; and Hindmarsh, Graham John, to Lucas Industries Limited. Electronic fuel control for a gas turbine engine. 4,040,250, Cl. 60-39.28R.

Saunders, Howard E.: *See*—
Elbling, Irving N.; and Saunders, Howard E., 4,040,993, Cl. 260-18.0EP.

Saunders, William K., to United States of America, Army. Air target fuze. 4,040,357, Cl. 102-70.20P.

Saunders, William T., to National Steel Corporation. Ironing ring having improved lubricating characteristics. 4,040,282, Cl. 72-41.000.

Savitsky, Evgeny Mikhailovich: *See*—
Smirnov, Viktor Sergeevich; Gryaznov, Vladimir Mikhailovich; Lebedeva, Valentina Ivanovna; Mischenko, Alexandr Petrovich; Polyakova, Victoria Petrovna; and Savitsky, Evgeny Mikhailovich, 4,041,093, Cl. 260-673.500.

Saxman, William Craig, to Dresser Industries, Inc. Rock boring cutter with thread-on replaceable cutting element. 4,040,493, Cl. 175-374.000.

Scardenzan, Anthony. Skateboard. 4,040,639, Cl. 280-87.04A.

Scepter Manufacturing Company Limited: *See*—
Torokvei, Thomas Evald, 4,040,517, Cl. 206-144.000.

Schairer, James Alfred, to Johns-Manville Corporation. System and method of monitoring the peak temperature of a moving mass. 4,040,563, Cl. 236-15.0BC.

Scheib, Harold A., to Bell & Howell Company. Film advancing mechanism with film threading facility. 4,040,730, Cl. 352-192.000.

Scheidler, Ralph E. Dual battery charge control. 4,041,363, Cl. 320-15.000.

Scheller, Herman, to Research-Cottrel, Inc. Apparatus for constructing concrete walls. 4,040,774, Cl. 425-65.000.

Schenker, Barry A.; and Franks, C. Richard, to Diamond Shamrock Corporation. Lead dioxide electrode. 4,040,939, Cl. 204-290.00F.

Schering Aktiengesellschaft: *See*—
Mueller, Rudolf, 4,040,606, Cl. 259-107.000.

Schertz, Charles W.; and Ritter, Edward H., to General Dynamics. Multiple spectrum co-axial optical sight and closed loop gun control system. 4,040,744, Cl. 356-152.000.

Schiebelhuth, Heinz F. Frequency indicator for receiving devices. 4,040,719, Cl. 350-160.0LC.

Schiller Industries, Inc.: *See*—
Hayosh, Thomas D.; and Torre, Anthony J., 4,041,322, Cl. 250-568.000.

Schinkel, Willem: *See*—
De Boer, Wilhelmus Johannes; Schinkel, Willem; and Span, Francis Johannes, 4,040,533, Cl. 214-310.000.

Schinski, William L.: *See*—
Platt, James L.; and Schinski, William L., 4,041,159, Cl. 424-228.000.

Schlage Lock Company: *See*—
Lasier, Thomas R.; Rodseth, William G.; and Schnarr, Raymond H., 4,040,143, Cl. 16-48.00J.
Lasier, Thomas R.; and Schnarr, Raymond H., 4,040,144, Cl. 16-66.000.

Schlanert, George A.; Wood, Lorin A.; and Rayburn, Gerald A., to McDonnell Douglas Corporation. Reverse thrust limiting system. 4,040,581, Cl. 244-83.00K.

Schlegel, Earl S.; and Page, Derrick J., to Westinghouse Electric Corporation. Integrated gate assisted turn-off, amplifying gate thyristor, and a method for making the same. 4,040,170, Cl. 29-577.000.

Schleuniger, Fritz: *See*—
Frossard, Emile; Schleuniger, Fritz; and Stadler, Bruno, 4,041,541, Cl. 361-27.000.

Schloemann-Siemag-Aktiengesellschaft of Duesseldorf: *See*—
Pielsticker, Klaus Peter; Mogendorf, Friedel; and Sonnabend, Karl Heinrich, 4,040,514, Cl. 198-774.000.

Schmidt, Guenter: *See*—
Krueger, Friedrich; and Schmidt, Guenter, 4,041,110, Cl. 260-938.000.

Schmidt, Peter Jurgen: *See*—
Wahl, Josef; Schmidt, Peter Jurgen; and Zechnall, Richard, 4,040,394, Cl. 123-32.0EA.

Schnarr, Raymond H.: *See*—
Lasier, Thomas R.; Rodseth, William G.; and Schnarr, Raymond H., 4,040,143, Cl. 16-48.00J.
Lasier, Thomas R.; and Schnarr, Raymond H., 4,040,144, Cl. 16-66.000.

Schneider, Henri, to Societe Suisse Pour l'Industrie Horlogere Management Services S.A. Power cell compartment for an electrically energized timepiece. 4,041,213, Cl. 429-98.000.

Schneider, Maurice: *See*—
Rodot, Huguette Fumeron; Schneider, Maurice; and Hruby, Arnost, 4,040,894, Cl. 156-609.000.

Schoen, Roy C.: *See*—
Huber, David A.; and Schoen, Roy C., 4,041,339, Cl. 310-239.000.

Schoeppl, Hubert; Petersen, Harro; Paulus, Gerhard; and Queins, Hubertus, to BASF Aktiengesellschaft. Rubber mixtures having improved surface tack. 4,041,222, Cl. 526-6.000.

Scholle Corporation: *See*—
Scholle, William R., 4,041,209, Cl. 428-500.000.

Scholle, William R., to Scholle Corporation. Multiple wall packaging material containing sulfite compound. 4,041,209, Cl. 428-500.000.

Schramm, Jurgen: *See*—
Sirrenberg, Wilhelm; Schramm, Jurgen; Klauke, Erich; Hammann, Ingeborg; and Stendel, Wilhelm, 4,041,177, Cl. 424-322.000.

Schroder, Dierk, to BBC Brown Boveri & Company Limited. Apparatus for rapidly detecting and calculating the root mean square of electrical measuring values in alternating current networks. 4,041,370, Cl. 323-8.000.

Schroeder, Daniel Ray, to Motorola, Inc. Transceiver squelch circuit. 4,041,390, Cl. 325-21.000.

Schuck, Paul R.; and Baylor, John M., to J.I. Case Company. Vibratory plow. 4,040,261, Cl. 61-72.600.

Schulein, Rolf G.: *See*—
Liebscher, Johannes; and Schulein, Rolf G., 4,040,546, Cl. 223-88.000.

Schulz, Johann G. D.: *See*—
Barie, Walter P., Jr.; Onopchenko, Anatoli; and Schulz, Johann G. D., 4,041,004, Cl. 260-32.8EP.

Schumann, Gunter: *See*—
Johne, Hans; Jentzsch, Arndt; Schumann, Gunter; Reichenberger, Roland; Kesselring, Horst; and Fischer, Karl-Heinz, 4,040,347, Cl. 101-349.000.

Schuyler, Donald R., II: *See*—
Richerson, David W.; and Schuyler, Donald R., II, 4,040,845, Cl. 106-38.900.

Schwaerzler, Hans-Juergen, to Messerschmitt-Boelkow-Blohm GmbH. Control apparatus for an air brake. 4,040,580, Cl. 244-78.000.

Schwan, Thomas J., to Morton-Norwich Products, Inc. 1-Benzyl-1,2-dihydro-3-methyl-2-oxopyrimidinium iodide. 4,041,035, Cl. 260-251.00R.

Schwander, Hansrudolf; and Karlen, Urs, to Ciba-Geigy Corporation. Anthraquinone dyestuffs of the disperse series. 4,041,052, Cl. 260-380.000.

Schwarz, Erwin, to R. P. Scherer Corporation. Locking hard gelatin capsule. 4,040,536, Cl. 220-8.000.

Schwarz, Heide, legal representative: *See*—
Binder, Walter; Hutter, Josef; Stich, Heinrich; Ruckensteiner, Kurt; Tines, Josef, deceased; Tines, Antonie, legal representative; and Schwarz, Heide, legal representative, 4,040,853, Cl. 106-103.000.

Schwarz, Werner; Hohmann, Eugen; and Nickel, Bernd, to Siemens Aktiengesellschaft. Electric fluid heating device. 4,041,276, Cl. 219-308.000.

Sciarrillo, Frank A. Golf swing training machine. 4,040,633, Cl. 273-191.00A.
Scientific Micro Systems, Inc.: *See*—
Krossa, Kenneth D.; and Earl, Douglas B., 4,041,471, Cl. 364-200.000.
SCM Corporation: *See*—
McGinniss, Vincent D., 4,040,925, Cl. 204-181.000.
Scott, Gordon N. Protection of pipe against damage to insulation and/or corrosion. 4,040,447, Cl. 138-106.000.
Seeger, Nelson V.; and Kaman, Andrew J., to PPG Industries, Inc. Transparent, impact-resistant polyesterurethane laminates. 4,041,208, Cl. 428-424.000.
Seelye, John F., to Monsanto Company. Method improvements in removing articles from wheel blow molding machines. 4,041,124, Cl. 264-336.000.
Seidel, Harold, to Bell Telephone Laboratories, Incorporated. Ordered array of integrated circuit semiconductor charge transfer device feedback delay type of stabilized phase-locked recursive oscillators. 4,040,728, Cl. 331-55.000.
Seiko Koki Kabushiki Kaisha: *See*—
Kitai, Kiyoshi; Nakamura, Yukio; Kato, Shogo; and Nagaoka, Shinji, 4,041,511, Cl. 354-232.000.
Seipp, Heinrich: *See*—
Achsel, Eberhard; Hortig, Hans-Peter; Seipp, Heinrich; and Giller, Heinz, 4,040,793, Cl. 23-273.00R.
Sekido, Kenzi; and Yoshikawa, Tsugio, to Hitachi, Ltd. Gate protecting device for hydraulic machines. 4,040,766, Cl. 415-9.000.
Sekmakas, Kazys; and Gotschall, George E., to DeSoto, Inc. High solids overprint varnish. 4,040,995, Cl. 260-22.0CQ.
Selby, John: *See*—
Lewis, Terence John; Brooks, Raymond; and Selby, John, 4,040,336, Cl. 90-11.00R.
Selley, Jeffrey E., to Hooker Chemicals & Plastics Corporation. High impact corrosion resistant polymers. 4,041,104, Cl. 260-859.00R.
Selwitz, Charles M., to Gulf Research & Development Company. Synthetic flush fluids. 4,040,956, Cl. 210-60.000.
Selwitz, Charles M.: *See*—
Bacha, John D.; and Selwitz, Charles M., 4,040,911, Cl. 203-9.000.
Shaffer, Howard Richard; and Frantz, Robert Houston, to AMP Incorporated. Tri-lead cable connector. 4,040,703, Cl. 339-99.00R.
Shah, Niranjan S.; and Taylor, James F., to NCR Corporation. Data processing internal communications system having plural time-shared intercommunication buses and inter-bus communication means. 4,041,472, Cl. 364-900.000.
Shanly, Alan L., to Xerox Corporation. Drum support apparatus. 4,040,157, Cl. 29-123.000.
Shapiro, Edward: *See*—
Bramer, Henry C.; and Shapiro, Edward, 4,041,128, Cl. 423-213.200.
Shapot, Mikhail Borisovich: *See*—
Axelrod, Shoya Samuilovich; Belozerov, Viktor Grigorievich; Gershman, Mikhail Bentsionovich; Margolin, Evel Grigorievich; and Shapot, Mikhail Borisovich, 4,041,218, Cl. 429-136.000.
Sharma, Satish Chander: *See*—
Kalafus, Edward Florent; and Sharma, Satish Chander, 4,040,999, Cl. 260-29.300.
Sharpe, Andrew Jackson, Jr.; Windhager, Robert H.; and Hearp, Kathleen Seese, to Calgon Corporation. Electroconductive polysalt complexes. 4,040,984, Cl. 252-500.000.
Shavel, John, Jr.: *See*—
Fabian, Arthur C.; Genzer, Jerome D.; Kasulanis, Charles Francis; Shavel, John, Jr.; and Zinnes, Harold, 4,041,042, Cl. 260-301.000.
Sheldrake, Leonard J.: *See*—
King, Charles W.; Ruff, Donald O.; and Sheldrake, Leonard J., 4,041,369, Cl. 322-99.000.
Shell Oil Company: *See*—
Davison, Sol; and Gergen, William P., 4,041,103, Cl. 260-857.00D.
Harris, Howard A., 4,040,968, Cl. 252-51.50A.
McClure, James D., 4,041,090, Cl. 260-671.00R.
Offeringa, Jan, 4,040,483, Cl. 166-272.000.
Roman, Steven A., 4,041,027, Cl. 542-400.000.
Shellhause, Ronald L., to General Motors Corporation. Failure warning switch actuator with automatic reset. 4,041,449, Cl. 340-52.00C.
Shemano, Irving, to Richardson-Merrell Inc. Pharmaceutically useful nitrogen containing heterocyclic derivatives. 4,041,165, Cl. 424-267.000.
Shepard, David H.; and Gushue, Edward J., to Cognitronics Corporation. Data handling system with remote document scanner. 4,041,454, Cl. 340-146.30F.
Shephard, Donald L., to Shephard, Helen I., a part interest. Condensation proof drinking glass assembly. 4,040,535, Cl. 215-100.500.
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Shephard, Donald L., 4,040,535, Cl. 215-100.500.
Shephard, Kenneth Paul; and Van Rheenen, Verlan H., to Upjohn Company, The. Process for the preparation of 17α-hydroxyprogesterones and corticoids from androstenes. 4,041,055, Cl. 260-397.300.
Sheppard, Howard H. Indicator for relay or the like. 4,040,382, Cl. 116-124.00L.
Sherwin, Dewayne James: *See*—
Walker, Ronald Jay; Sherwin, Dewayne James; and Rumpf, Robert John, 4,040,576, Cl. 242-107.40A.
Shiba, Keisuke: *See*—
Arai, Atsuaki; Shiba, Keisuke; Yamada, Minoru; Furutachi, Nobuo; and Nakamura, Kotaro, 4,040,835, Cl. 96-56.500.
Shida, Mitsuzo: *See*—
Hoff, Raymond E.; Pullukat, Thomas J.; and Shida, Mitsuzo, 4,041,224, Cl. 526-96.000.
Shidara, Keiichi; Goto, Naohiro; Maruyama, Eiichi; Hirai, Tadaaki; and Fujita, Tsutomu, to Hitachi, Ltd.; and Nippon Hoso Kyokai. Photoconductive films. 4,040,985, Cl. 252-501.000.
Shidel, Jerome E.; and Sampey, Harry R., to Pentron Industries, Inc. Bi-directional motion sensing and clocking system. 4,041,285, Cl. 235-150.270.
Shikhirev, Boris Nikolaevich; Matrosov, Evgeny Arkadievich; and Deresh, Ilya Abramovich. Device for the treatment of sheet materials. 4,040,209, Cl. 51-80.00A.
Shiki, Mikio: *See*—
Oshima, Akira; Yoshihara, Keisuke; Shiki, Mikio; and Ikeda, Tuneo, 4,041,120, Cl. 264-171.000.
Shimamura, Isao: *See*—
Iwano, Haruhiko; and Shimamura, Isao, 4,040,834, Cl. 96-50.00A.
Shimizu, Shinji; Iwamatsu, Seiichi; and Homma, Makoto, to Hitachi, Ltd. MIS semiconductor device and method of manufacturing the same. 4,041,518, Cl. 357-23.000.
Shinoda, Naoharu: *See*—
Atsukawa, Masumi; Kamei, Kazumi; Shinoda, Naoharu; and Ushio, Hiroyuki, 4,040,803, Cl. 55-73.000.
Shionogi & Co., Ltd.: *See*—
Ogata, Masaru; and Matsumoto, Hiroshi, 4,041,026, Cl. 260-239.30D.
Shiraga, Chitoshi: *See*—
Hino, Masanori; Eguchi, Taro; and Shiraga, Chitoshi, 4,040,503, Cl. 181-192.000.
Shiren, Norman Steven: *See*—
Melcher, Robert Lee; and Shiren, Norman Steven, 4,041,536, Cl. 358-213.000.
Shitara, Hisao; and Takada Koosuke, to Tokyo Shibaura Electric Co., Ltd. Magnetron anode and a method for manufacturing the same. 4,041,350, Cl. 315-39.750.
Shoji, Fusaji; Kokaku, Hiroyoshi; Kohkame, Hisashi; and Kakefuda, Koiti, to Hitachi, Ltd. Process for producing vinyl graft copolymer resin. 4,041,108, Cl. 260-881.000.
Shortt, Brian A.: *See*—
Feuersanger, Alfred E.; and Shortt, Brian A., 4,041,447, Cl. 340-174.0TF.
Shotbolt, Keith, to Comex Marine Services, Inc. Articulate conduit connector. 4,040,650, Cl. 285-18.000.
Showa Sangyo Co. Ltd.: *See*—
Watanabe, Haruo; Kitagawa, Toru; Negishi, Masaaki; Aonuki, Kiichi; and Kobayashi, Harunobu, 4,041,059, Cl. 260-424.000.
Shumaker, Lyle L.: *See*—
Soska, Frank A.; and Shumaker, Lyle L., 4,040,888, Cl. 156-497.000.
Shumrak, George; and Mack, Anthony, to Sweetheart Plastics, Inc. Portable tray warming unit. 4,041,277, Cl. 219-386.000.
Shuster, Edward J.; Withycombe, Donald Arthur; Mookherjee, Braja Dulal; and Mussinan, Cynthia J., to International Flavors & Fragrances Inc. 2-Alkyl-substituted-4,5-dimethyl thiazoline perfume and cologne compositions. 4,040,987, Cl. 252-522.000.
Shuster, Edward J.: *See*—
Hall, John B.; Hruza, Denis E.; Vock, Manfred Hugo; Vinals, Joaquin; and Shuster, Edward J., 4,041,069, Cl. 260-486.00R.
Light, Kenneth K.; Shuster, Edward J.; Vinals, Joaquin F.; and Vock, Manfred Hugo, 4,041,084, Cl. 260-617.00F.
Sideris, Sotirios: *See*—
Rzeszewski, Theodore S.; Frantzis, Paul D.; and Sideris, Sotirios, 4,041,535, Cl. 358-191.000.
Sidorak, Leroy G.: *See*—
Forestieri, Americo F.; Ratajczak, Anthony F.; and Sidorak, Leroy G., 4,040,867, Cl. 136-89.00P.
Siemens Aktiengesellschaft: *See*—
Haass, Adolf, 4,041,239, Cl. 178-68.000.
Hini, Paul, 4,041,371, Cl. 323-94.00H.
Horninger, Karlheinrich, 4,041,459, Cl. 340-166.00R.
Koeth, Helmut, 4,041,418, Cl. 333-18.000.
Konig, Justus; and Rohrig, Josef, 4,041,245, Cl. 179-18.0AB.
Maas, Michael, 4,041,328, Cl. 307-351.000.
Maringer, Albert, 4,041,373, Cl. 324-15.000.
Rubner, Roland; Kleeberg, Wolfgang; and Kuhn, Eberhard, 4,040,831, Cl. 96-35.100.
Schwarz, Werner; Hohmann, Eugen; and Nickel, Bernd, 4,041,276, Cl. 219-308.000.
Sturmer, Wilhelm, 4,041,323, Cl. 307-88.300.
Vogt, Herbert, 4,041,523, Cl. 357-72.000.
Signetics Corporation: *See*—
Blish, Richard C., II; and Lemons, Kyle Eugene, 4,040,897, Cl. 156-656.000.
Rose, Ralph E., 4,040,169, Cl. 29-577.000.
Signorelli, John A.; and Haus, Paul Z., Jr. Security lock and key. 4,040,279, Cl. 70-34.000.
Sikra, John F.: *See*—
Blajda, Raymond S.; Kantenwein, Robert W.; Gaughan, Gerald E.; and Sikra, John F., 4,040,359, Cl. 102-93.000.
Siler, Harold L., Jr.; and Roberts, Cecil P., to Anchor Hocking Corporation. Means for compensating container feed trip for speed changes. 4,040,236, Cl. 53-67.000.
Silverman Machines, Inc.: *See*—
Silverman, Seymour; Costa, Paul F.; and Block, Charles, 4,040,366, Cl. 112-121.290.
Silverman, Seymour; Costa, Paul F.; and Block, Charles, to Silverman

Machines, Inc. Automatic hemming apparatus. 4,040,366, Cl. 112-121.290.

Simco, Inc.: *See—*
Mason, Stanley L., Jr.; Handler, Michael D.; and Richardson, James E., 4,040,568, Cl. 239-57.000.

Simmonds, Leonard B., to Westinghouse Electric Corporation. Magnetic wedge. 4,040,971, Cl. 252-62.540.

Simmons, Robert B.: *See—*
Hoekje, Howard H.; Carlson, Gordon A.; and Simmons, Robert B., 4,040,934, Cl. 204-256.000.

Simon, Eli. Heat-convertible reaction products of equal mol ratios of s-diphenylcarbazide and an aromatic dianhydride. 4,041,034, Cl. 260-250.00P.

Simon, Rachel: *See—*
Garrick, Laurence James; and Simon, Rachel, 4,040,655, Cl. 296-63.000.

Simons, Charles W.; O'Neill, Gerald J.; and Gribens, Joel A., to W. R. Grace & Co. New aerosol propellants for personal products. 4,041,148, Cl. 424-45.000.

Simons, Sanford L.; and McNeill, Frederick M., to Simons, Sanford L. Apparatus, instrumentation, and method for comparing samples. 4,040,788, Cl. 23-230.00R.

Simplex Time Recorder: *See—*
Michel, Wilfried; Reichert, Hartmut; and Willmann, Erich, 4,041,503, Cl. 346-83.000.

Simpson, Benny E.: *See—*
Nimerick, Kenneth H.; and Simpson, Benny E., 4,040,967, Cl. 252-8.55R.

Singer Company, The: *See—*
Christopoulos, John, 4,040,274, Cl. 66-57.000.
Douglas, Robert Ritson, 4,040,296, Cl. 73-281.000.
Kahan, William; Rupinski, Fredrick Alexander; Wagner, John Francis; and Peer, Thomas Richard, 4,040,277, Cl. 66-154.00A.

Sinnott, Vernon J., to Raymond Lee Organization, Inc., The, a part interest. Water gun game. 4,040,622, Cl. 273-86.00R.

Sipman, Robert H.: *See—*
Ault, Earl R.; Stevens, Philip C.; Sipman, Robert H.; and Bradford, Robert S., Jr., 4,041,415, Cl. 331-94.5PE.

Sipos, Frank; and Keseleski, Adam J., to E. R. Squibb & Sons, Inc. Amphotericin B methyl ester salts. 4,041,232, Cl. 536-17.000.

Sipowicz, Alexander D. Electrical feed-through assembly and method of making same. 4,041,240, Cl. 174-151.000.

Sippican Corporation, The: *See—*
Washburn, Ralph G., 4,041,382, Cl. 324-65.00R.

Sirrenberg, Wilhelm; Schramm, Jurgen; Klauke, Erich; Hammann, Ingeborg; and Stendel, Wilhelm, to Bayer Aktiengesellschaft. 4-Nitro-4'-[N-(N'-benzoyl)-ureido]-diphenyl ethers. 4,041,177, Cl. 424-322.000.

Skalle, Olaf Narten. Warning, marking and/or barrier arrangement. 4,040,759, Cl. 404-6.000.

SKF Industrial Trading and Development Company B.V.: *See—*
Korenhof, Abraham, 4,040,683, Cl. 308-187.100.

SKF Industries, Inc.: *See—*
Kapaan, Hendrikus Jan, 4,040,684, Cl. 308-187.100.

Skibo, Phillip M. Bait casting device. 4,040,198, Cl. 43-19.000.

Skidmore, Frank Oren. Pneumatic tire and method of making same. 4,040,464, Cl. 152-361.00R.

Skogman, Richard A.: *See—*
Chaffin, John H., III; and Skogman, Richard A., 4,040,927, Cl. 204-192.00S.

Skrobisch, Alfred: *See—*
Trunk, Edmund G.; and Skrobisch, Alfred, 4,041,524, Cl. 357-81.000.

Skubic, Leroy F., to Paltior Corporation, The. Mounting means. 4,040,228, Cl. 52-710.000.

Slane, Francis L.; and Allison, Truman L., to Industrial Solid State Controls, Inc. Fault monitoring and reporting system for trains. 4,041,470, Cl. 364-900.000.

Slater, Eban A. Novel rabies virus vaccine and processes. 4,040,904, Cl. 195-1.300.

Slovitt, Miriam: *See—*
Slovitt, Simon; and Slovitt, Miriam, 4,040,127, Cl. 2-174.000.

Slovitt, Simon; and Slovitt, Miriam. Lip protector. 4,040,127, Cl. 2-174.000.

Slutzky, Joel; Hausman, LeeRoy W., Jr.; and Kostenbauer, Ronald F., to Infodetics, Inc. Document filing, updating and retrieval system. 4,041,463, Cl. 364-900.000.

Slysh, Paul, to General Dynamics. Isogrid shell gun mount. 4,040,333, Cl. 89-37.50R.

Smethers, Rollo G., Jr., to Lockheed Aircraft Corporation. Missile launcher for aircraft. 4,040,334, Cl. 89-1.804.

Smierciak, Walter R.: *See—*
Kartasuk, Raymond H.; Smierciak, Walter R.; and Hlinka, Edward A., 4,040,613, Cl. 269-247.000.

Smirnov, Viktor Sergeevich; Gryaznov, Vladimir Mikhailovich; Lebedeva, Valentina Ivanovna; Mischenko, Alexandr Petrovich; Polyakova, Victoria Petrovna; and Savitsky, Evgeny Mikhailovich. Method of dehydrogeneration, dehydrocyclization and hydrodealkylation. 4,041,093, Cl. 260-673.500.

Smith, Charles L.: *See—*
McCray, Walter A.; and Smith, Charles L., 4,040,471, Cl. 164-92.000.

Smith, Edward G.: *See—*
Rote, Everett A.; and Smith, Edward G., 4,040,678, Cl. 308-6.00R.

Smith, Frederick R., to Avtex Fibers Inc. Method for making high fluid-holding fiber mass. 4,041,121, Cl. 264-191.000.

Smith International, Inc.: *See—*
Kellner, Jackson M., 4,040,494, Cl. 175-45.000.
Kellner, Jackson M.; and Garrett, William R., 4,040,495, Cl. 175-73.000.

Smith, Jessop; and Kocis, Thomas Robert, to Triple-S Development Co., Inc. Rifle. 4,040,196, Cl. 42-23.000.

Smith, Leslie Harold, to Imperial Chemical Industries Limited. Phenoxy-alkanolamine derivatives. 4,041,075, Cl. 260-558.00P.

Smith, Raymond J. D.: *See—*
Orth, Edward D.; Roberts, John A.; and Smith, Raymond J. D., 4,040,936, Cl. 204-271.000.

Smith, Richard E., to Xerox Corporation. Retractable edge seals for electrostatographic development systems. 4,040,386, Cl. 118-653.000.

Smith, Roy B. Drive shaft U-joint lubricator. 4,040,504, Cl. 184-1.00E.

Smith, Trevor Stanley, to Lucas Industries Limited. Flow control valves for liquids. 4,040,599, Cl. 251-28.000.

Smith & Wesson Chemical Company, Inc.: *See—*
Litman, Alan, 4,040,331, Cl. 89-14.00C.

Smithers, Peter Alan: *See—*
Gold, Bernard Samuel; and Smithers, Peter Alan, 4,041,367, Cl. 363-97.000.

SmithKline Corporation: *See—*
Berges, David A., 4,041,162, Cl. 424-246.000.

Snell, Brian Kenneth, to Imperial Chemical Industries Limited. Fungicidal pyrimidine derivatives. 4,041,157, Cl. 424-200.000.

Snell, George J.: *See—*
Sze, Morgan C.; and Snell, George J., 4,040,957, Cl. 210-73.00R.

Snodgrass, John O.: *See—*
Johnson, Harlan B.; Martinsons, Aleksandrs; and Snodgrass, John O., 4,040,918, Cl. 204-98.000.

Snow, Kenneth T.; and Snow, Kenneth T., Jr. Building brace. 4,040,232, Cl. 52-720.000.

Snow, Kenneth T., Jr.: *See—*
Snow, Kenneth T.; and Snow, Kenneth T., Jr., 4,040,232, Cl. 52-720.000.

Snyder, Louis J., to Ethyl Corporation. Air sampling apparatus. 4,040,299, Cl. 73-421.50R.

Sobel, Jay E., to UOP Inc. HF alkylation process with addition of acid regenarator bottoms to the recycle isoparaffin stream. 4,041,101, Cl. 260-683.510.

Socas, Eduardo L. Adjustable projector table. 4,040,585, Cl. 248-11.000.

Societe Alsacienne de Constructions Mecaniques de Mulhouse, of Mulhouse Cedex: *See—*
Juillard, Yves; and Riner, Victor, 4,040,453, Cl. 139-446.000.

Societe Anonyme de Telecommunications: *See—*
Lorans, Dominique Y., 4,041,271, Cl. 219-86.000.

S.A. Des Anciens Etablissements Paul Wurth: *See—*
Mahr, Rene N.; and Engel, Aloyse J., 4,040,530, Cl. 214-35.00R.

Societe Anonyme dite: Etude et Realisation de Chaines Automatiques - ERCA: *See—*
Philippon, Raymond C., 4,040,561, Cl. 229-43.000.

Societe d'Etudes et de Realisations Scientifiques en Abrege S.E.R.E.S.-C.I.S.P.R.L.: *See—*
De Muylder, Jean Marie, 4,041,171, Cl. 424-301.000.

Societe D'Exploitation Des Procedes Felix Amiot S.E.P.F.A.: *See—*
Cadic, Raymond, 4,040,305, Cl. 74-242.15R.

Societe Generale de Constructions Electriques et Mecaniques Alsthom: *See—*
Alexandre, Philippe, 4,040,442, Cl. 137-543.170.

Societe Suisse Pour l'Industrie Horlogere Management Services S.A.: *See—*
Schneider, Henri, 4,041,213, Cl. 429-98.000.

Soda, Atsuhiko: *See—*
Tsunashima, Kenji; Sugioka, Masanao; Soda, Atsuhiko; Ikeuchi, Hiroyuki; and Tanaka, Michihiko, 4,041,206, Cl. 428-409.000.

Sola Basic Industries, Inc.: *See—*
Donahue, James T.; Hall, Kenneth M.; and Worth, Arthur J., 4,041,358, Cl. 361-365.000.

Soldati, Gianluigi, to Carter-Wallace, Inc. Chlorination of 2,3-dimethyl-1,2,4-benzothia-diazine 1,1-dioxide. 4,041,028, Cl. 544-12.000.

Solomon, Anthony T.: *See—*
Crawford, William B.; and Solomon, Anthony T., 4,040,367, Cl. 112-273.000.

Solomon, Paul W.: *See—*
Uraneck, Carl A.; and Solomon, Paul W., 4,041,227, Cl. 526-190.000.

Somers, Gerardus Henricus Johannus: *See—*
Karsmakers, Mathijs Antonius; and Somers, Gerardus Henricus Johannus, 4,040,297, Cl. 73-398.0AR.

Sonnabend, Karl Heinrich: *See—*
Pielsticker, Klaus Peter; Mogendorf, Friedel; and Sonnabend, Karl Heinrich, 4,040,514, Cl. 198-774.000.

Sony Corporation: *See—*
Kaneko, Shinji, 4,041,526, Cl. 358-4.000.
Kikuchi, Yasuo; Ohmichi, Yasuyuki; Terasaki, Osamu; and Sakai, Koichi, 4,041,428, Cl. 335-210.000.
Kishi, Yoshio, 4,041,537, Cl. 360-60.000.
Kitamura, Nobuo; Takada, Katsuo; and Fukagawa, Hiroshi, 4,041,401, Cl. 325-455.000.
Mogi, Takao, 4,041,402, Cl. 325-465.000.
Onodera, Toshio, 4,041,355, Cl. 315-411.000.
Tsuda, Yukio, 4,041,399, Cl. 325-357.000.
Umeda, Kaoru, 4,041,334, Cl. 307-293.000.
Umeda, Kenkichi; Nakamura, Shoichi; Takayama, Jun; Horichi, Tetsuya; and Tsuchiya, Yoshikazu, 4,041,453, Cl. 340-146.1BE.

Soska, Frank A.; and Shumaker, Lyle L., to PPG Industries, Inc.

Apparatus for prepressing transparent laminated assemblies. 4,040,888, Cl. 156-497.000.
Sota, Tadamichi: *See—*
Potier, Pierre Roger; and Sota, Tadamichi, 4,040,469, Cl. 164-56.000.
Span, Francis Johannes: *See—*
De Boer, Wilhelmus Johannes; Schinkel, Willem; and Span, Francis Johannes, 4,040,533, Cl. 214-310.000.
Spaziante, Placido M.: *See—*
Nidola, Antonio; Spaziante, Placido M.; and de Nora, Vittorio, 4,040,914, Cl. 204-12.000.
Spector, Samuel. Flashlight. 4,041,304, Cl. 240-10.680.
Speer, Spencer J., to General Dynamics. Packaging and dispensing kit. 4,040,420, Cl. 128-218.00M.
Speidel, John A. Integral seating unit. 4,040,662, Cl. 297-445.000.
Spence Engineering Company: *See—*
Zaki, Moustafa A., 4,040,440, Cl. 137-375.000.
Spence, John R.; and Kinney, Bruce W., Jr., to Rockwell International Corporation. Selectable eight or twelve digit integrated circuit calculator and conditional gate output signal modification circuit therefor. 4,041,330, Cl. 307-251.000.
Speranzin, Claudio, to Officine Savio, S.p.A. Device for distributing softening liquid on the yarn during the twisting process. 4,040,241, Cl. 57-35.000.
Sperry Electronics Ltd.: *See—*
Watts, Gary P., 4,041,400, Cl. 325-392.000.
Sperry, John Arthur: *See—*
Hepher, Martin; Sperry, John Arthur; and Stewart, Malcolm John, 4,041,204, Cl. 428-199.000.
Spicer, Larry Dean: *See—*
Milionis, Jerry Peter; and Spicer, Larry Dean, 4,041,151, Cl. 424-78.000.
Spitznagel, John A.: *See—*
Bleiberg, Melvin L.; Diamond, Sidney; Rowcliffe, Arthur F.; and Spitznagel, John A., 4,040,876, Cl. 148-37.000.
Sprecher & Schuh AG: *See—*
Amsler, Joachim, 4,041,262, Cl. 200-144.00B.
Sproul, William W., III: *See—*
Kratz, Gary L.; Sproul, William W., III; Walendziewicz, Eugene T.; Wallis, Donald E.; and Dennis, Charles A., 4,041,461, Cl. 364-200.000.
Sprunck, Emile: *See—*
Leroy, Pierre; and Sprunck, Emile, 4,040,611, Cl. 266-243.000.
Leroy, Pierre; and Sprunck, Emile, 4,040,612, Cl. 266-268.000.
Square D Company: *See—*
Butler, DeForest D.; and Mancik, Andy, 4,040,449, Cl. 138-92.000.
Jorgensen, George N.; King, Frank D.; and Butler, DeForest D., 4,040,755, Cl. 403-205.000.
Kampf, Julian C.; Lemke, Winfred R.; and Tucker, James T., 4,041,540, Cl. 361-24.000.
Ophaug, Darrell P.; and Layton, Beryl W., 4,041,423, Cl. 335-20.000.
Swindler, David L.; and Dykes, Donald L., 4,041,260, Cl. 200-50.00A.
Stadler, Bruno: *See—*
Frossard, Emile; Schleuniger, Fritz; and Stadler, Bruno, 4,041,541, Cl. 361-27.000.
Stahlhuth, Paul H.: *See—*
Page, Joe W., Jr.; and Stahlhuth, Paul H., 4,040,311, Cl. 74-750.00R.
Standard Oil Company, The: *See—*
Talsma, Herbert; and Giffen, William M., Jr., 4,041,005, Cl. 260-32.80A.
Standard Oil Company a corporation of Indiana: *See—*
Allen, John K.; and Bertolacini, Ralph J., 4,041,089, Cl. 260-668.00A.
Fields, Ellis K., 4,040,921, Cl. 204-158.00R.
Standard Oil Company (Indiana): *See—*
Fenoglio, David J., 4,041,016, Cl. 260-45.85E.
Lindberg, Steven E.; Marchant, Kerford A., Jr.; and Van Strien, Richard E., 4,041,065, Cl. 260-47.0CZ.
Stanelle, Karl-Heinz. Vessel with an upright shell. 4,040,218, Cl. 52-194.000.
Stanley, Richard B. Antifriction roller bearing. 4,040,689, Cl. 308-205.000.
Starck, Hermann C.: *See—*
Glaeser, Wolfgang; and Mathy, Wolfgang, 4,041,138, Cl. 423-464.000.
Start, John Francis: *See—*
Franko-Filipasic, Borivoj Richard; and Start, John Francis, 4,040,843, Cl. 106-15.0FP.
Staver Company, Inc., The: *See—*
Trunk, Edmund G.; and Skrobisch, Alfred, 4,041,524, Cl. 357-81.000.
Steadham, Richard A.: *See—*
Goodling, John S.; McDaniel, Gayner R.; and Steadham, Richard A., 4,040,425, Cl. 128-303.140.
Steddom, Clark M.; and Yungblut, Charles W., to Carrier Corporation. Potentiometers. 4,041,439, Cl. 338-78.000.
Steeves, Claire L. Device and method for cleaning leaves and debris from swimming pools. 4,040,864, Cl. 134-6.000.
Steffek, Robert J.: *See—*
Amor, William H., Jr.; and Steffek, Robert J., 4,041,320, Cl. 250-523.000.
Steiger, Rolf; Reber, Jean-Francois; Ezekiel, Aaron David; and Ficken, Geoffrey Ernest, to Ciba-Geigy AG. Spectral sensitization of photographic material with natural colloids containing sensitizing dye groups. 4,040,825, Cl. 96-1.700.
Stein, Thomas R.: *See—*
Ireland, Henry R.; and Stein, Thomas R., 4,041,097, Cl. 260-676.00R.
Steinberg, Marvin P.: *See—*
Nelson, Alvin I.; Steinberg, Marvin P.; and Wei, Lun-Shin, 4,041,187, Cl. 426-598.000.
Steinemann, Samuel G.; and Perren, Stephan M., to Institut Dr. Ing. Reinhard Straumann AG. Surgical implant and alloy for use in making an implant. 4,040,129, Cl. 3-1.900.
Steinhauer, Roger C.; and Bertozzi, Richard J., to Armour-Dial, Inc. Fabric softener. 4,040,966, Cl. 252-8.800.
Steinke, Dieter: *See—*
Decker, Gerd; Steinke, Dieter; and Reichel, Kurt, 4,040,393, Cl. 123-30.00A.
Stendel, Wilhelm: *See—*
Maurer, Fritz; Riebel, Hans-Jochem; Hammann, Ingeborg; and Stendel, Wilhelm, 4,041,158, Cl. 424-212.000.
Sirrenberg, Wilhelm; Schramm, Jurgen; Klauke, Erich; Hammann, Ingeborg; and Stendel, Wilhelm, 4,041,177, Cl. 424-322.000.
Stepochkin, Lev Mikhailovich: *See—*
Makeev, Boris Anatolievich; Stepochkin, Lev Mikhailovich; Korot, Garri Moiseevich; Batozsky, Vadim Ivanovich; Khodorov, Alexandr Iosifovich; Zhuravlev, Vitaly Ivanovich; and Eremenko, Adolf Grigorievich, 4,040,318, Cl. 83-71.000.
Sterlicchi, Helen: *See—*
Sterlicchi, Pasquale; and Sterlicchi, Helen, 4,040,626, Cl. 273-123.00R.
Sterlicchi, Pasquale; and Sterlicchi, Helen. Ball and puck game. 4,040,626, Cl. 273-123.00R.
Sterling Drug Inc.: *See—*
Eggensperger, Heinz; and Diehl, Karl-Heinz, 4,040,977, Cl. 252-401.000.
Stern, Allen E., to United States of America, Army. Gravity-deployed double-ended anti-tank mine. 4,040,354, Cl. 102-8.000.
Stern, Marvin J., to Alloy Metals, Inc. Aluminum base fluxless brazing alloy. 4,040,822, Cl. 75-140.000.
Stevens, Clayton O.: *See—*
Penton, Hugh V.; Dunphy, Gerald P.; and Stevens, Clayton O., 4,040,194, Cl. 40-142.00A.
Stevens, Philip C.: *See—*
Ault, Earl R.; Stevens, Philip C.; Sipman, Robert H.; and Bradford, Robert S., Jr., 4,041,415, Cl. 331-94.5PE.
Stevenson, Howard R., Jr., to General Electric Company. Split gate tracker using bipolar converter. 4,041,485, Cl. 343-7.300.
Stewart-Hall Chemical Co.: *See—*
Hessel, Harold H.; and Kiele, Francis S., 4,040,515, Cl. 206-.500.
Stewart, John W., to NCR Corporation. Solenoid driver circuit. 4,041,546, Cl. 361-152.000.
Stewart, Malcolm John: *See—*
Hepher, Martin; Sperry, John Arthur; and Stewart, Malcolm John, 4,041,204, Cl. 428-199.000.
Stich, Heinrich: *See—*
Binder, Walter; Hutter, Josef; Stich, Heinrich; Ruckensteiner, Kurt; Tines, Josef, deceased; Tines, Antonie, legal representative; and Schwarz, Heide, legal representative, 4,040,853, Cl. 106-103.000.
Stieger, Helmut: *See—*
Winkelmann, Detlef; Lohr, Bernd; and Stieger, Helmut, 4,040,735, Cl. 355-10.000.
Stierwalt, Donald L.: *See—*
Potter, Roy F.; and Stierwalt, Donald L., 4,041,313, Cl. 250-341.000.
Stine, Clifford R.; Klipec, Bruce E.; and Herbert, William J., to Samuel Moore & Company. Electric conductor adapted for use in process instrumentation. 4,041,237, Cl. 174-36.000.
Stockdale, Douglas P.; Mencarini, Richard; Deaton, Carlton D.; and Owen, Ralph M., to Baxter Travenol Laboratories, Inc. Method and device for racking and sealing containers. 4,040,234, Cl. 53-38.000.
Stockman, Richard Franklin; and Baker, Roderick Jay, to Air Preheater Company, Inc., The. Axially movable sector plate support for rotary regenerative heat exchanger. 4,040,475, Cl. 165-9.000.
Stodt, Eberhard: *See—*
Pessel, Kurt; and Stodt, Eberhard, 4,040,230, Cl. 53-24.000.
Stoides, John G.: *See—*
Ott, David M.; Ott, Cynthia Bunce; and Stoides, John G., 4,041,456, Cl. 340-146.30R.
Stolar, Morris E., to Abic Ltd. Water-suspendible composition comprising robenidine. 4,041,160, Cl. 424-229.000.
Stolfa, Frank, to UOP Inc. Combination thermal cracking and coking process. 4,040,943, Cl. 208-80.000.
Stone, Julian: *See—*
Burrus, Charles Andrew, Jr.; and Stone, Julian, 4,040,890, Cl. 156-605.000.
Stone, Richard D., to UOP Inc. Moving bed contacting process and apparatus. 4,040,794, Cl. 23-288.00G.
Stone & Webster Engineering Corporation: *See—*
Foster, Raymond C.; and Humphries, James J., Jr., 4,041,129, Cl. 423-234.000.
Stratmann, Josef: *See—*
Knappstein, Johannes; and Stratmann, Josef, 4,040,910, Cl. 202-262.000.
Streck, Donald A.: *See—*
Pogson, John T.; and Streck, Donald A., 4,040,478, Cl. 165-105.000.
Strever, Walter: *See—*
Ottmann, Norman; and Strever, Walter, 4,041,118, Cl. 264-71.000.

Stromberg-Carlson Corporation: *See*—
Altenburger, Otto; and Dorazio, Alton E., 4,041,253, Cl. 179-175.20R.

Stroom, Paul D.; and Braunreiter, Carl J., to Minnesota Mining and Manufacturing Company. High efficiency heat exchanger with ceramic rotor. 4,040,474, Cl. 165-9.000.

Strothers, Claude, Jr. Automatic phase compensation circuit for paralleling power amplifiers in the microwave frequency range. 4,041,413, Cl. 330-43.000.

Strycker, Stanley J., to Dow Chemical Company, The. Substituted phenoxyalkyl quaternary ammonium compounds as antiarrhythemic agents. 4,041,178, Cl. 424-329.000.

Stuart, Robert W., to Dynamics Research Corporation. Multi-axis encoder processing and display system. 4,041,466, Cl. 364-900.000.

Stubits, Marcella C.; and Teng, James, to Anheuser-Busch, Incorporated. Water dispersible chewing gum base. 4,041,179, Cl. 426-3.000.

Sturgeon, Clayton L., to Ranger Engineering Corporation. Quantized amplifier. 4,041,411, Cl. 330-207.00A.

Sturmer, Wilhelm, to Siemens Aktiengesellschaft. Non-linear optical frequency doubling devices. 4,041,323, Cl. 307-88.300.

Sudler, Roland; and Hartung, Klaus-Dieter, to VDO Adolf Schindling AG. Single phase stepper motor. 4,041,336, Cl. 310-49.00R.

Sudyk, John R.: *See*—
Telle, Byron J.; and Sudyk, John R., 4,040,476, Cl. 165-76.000.

Sugihara, Hirosada; Motohashi, Michio; Watanabe, Masazumi; Nishikawa, Masao; and Sanno, Yasushi, to Takeda Chemical Industries, Ltd. Bicyclic compounds. 4,041,079, Cl. 260-574.000.

Sugino, Toshio: *See*—
Okada, Yoshitsugu; Nanao, Teruaki; and Sugino, Toshio, 4,040,443, Cl. 137-546.000.

Sugioka, Masanao: *See*—
Tsunashima, Kenji; Sugioka, Masanao; Soda, Atsuhiko; Ikeuchi, Hiroyuki; and Tanaka, Michihiko, 4,041,206, Cl. 428-409.000.

Sugiyama, Masatoshi; and Ogawa, Akira, to Fuji Photo Film Co., Ltd. Photographic sensitive elements having dyed layers. 4,040,840, Cl. 96-84.00A.

Sullivan, Francis R.: *See*—
Clovis, James S.; and Sullivan, Francis R., 4,041,107, Cl. 260-876.00R.

Sumitomo Aluminum Smelting Company, Ltd.: *See*—
Abe, Tatsuo; Okamoto, Toshiki; Sakakura, Takao; and Tateno, Tatsuo, 4,041,137, Cl. 423-489.000.

Sumitomo Chemical Company, Limited: *See*—
Yamada, Eiji; Ito, Hiroaki; and Akamatsu, Takashi, 4,041,051, Cl. 260-373.000.

Sun Oil Company of Pennsylvania: *See*—
Hansel, William B., 4,040,448, Cl. 138-42.000.
Hansel, William B., 4,040,458, Cl. 141-392.000.

Sun Ventures, Inc.: *See*—
Moore, Robert E.; and Janoski, Edward J., 4,041,086, Cl. 260-648.00F.

Sunada, Masayoshi; and Kubokura, Kuniaki, to Hitachi, Ltd. Control circuit for controlling the shaft speed of a motor having clutch and brake devices. 4,040,508, Cl. 192-12.00D.

Sunami, Hideo; Itoh, Yokichi; Inose, Fumiyuki; and Kamigaki, Yoshiaki, to Hitachi, Ltd. Shift array for pattern information processing device utilizing charge coupled semiconductor device. 4,041,521, Cl. 357-24.000.

Sunpak Corporation: *See*—
Edamoto, Akio; and Hayakawa, Tooru, 4,041,508, Cl. 354-128.000.

Suntech, Inc.: *See*—
Chaney, Preston E.; and Morgan, George W., 4,040,262, Cl. 61-86.000.

Supraton Aurer & Zucker OHG, Firma: *See*—
Kohlheb, Robert, 4,040,965, Cl. 210-297.000.

Suriano, Patsy. Bending rolls machine. 4,040,283, Cl. 72-175.000.

Suroff, Leonard W., to Xygiene, Inc. Ultrasonic personal care instrument and method. 4,040,414, Cl. 128-24.00A.

Suzuki, Akira; Orihara, Ituo; and Ishida, Akira, to Kanto Denka Kogyo Co., Ltd. Synthetic resin composition. 4,041,235, Cl. 428-413.000.

Suzuki, Junichi: *See*—
Inoyama, Tadao; Goto, Tatsuo; Takeyasu, Kiyoo; Ishimura, Hiroshi; and Suzuki, Junichi, 4,041,294, Cl. 235-151.110.

Suzuki, Takenori: *See*—
Takeda, Shiroh; Nagai, Yuji; and Suzuki, Takenori, 4,041,009, Cl. 260-42.180.

Suzuki, Teruki: *See*—
Fukuzawa, Tadashi; Suzuki, Teruki; and Sato, Shigeru, 4,041,319, Cl. 250-460.000.

Suzuki, Yukio: *See*—
Kominami, Yasuo; Suzuki, Yukio; and Kawamura, Masami, 4,041,409, Cl. 330-29.000.

Svensson, Karl-Erik: *See*—
Nordblad, Sven Sigurd; and Svensson, Karl-Erik, 4,040,269, Cl. 62-374.000.

Swain, Leonard W.; and Bower, Allen M., to Emco Limited. Automatic shut off for gravity filling system for liquid storage tanks. 4,040,455, Cl. 141-225.000.

Swainson, Wyn Kelly. Method, medium and apparatus for producing three-dimensional figure product. 4,041,476, Cl. 340-173.0CC.

Swanson, Donald F., to Whirlpool Corporation. Ice maker with thermostatic water control. 4,040,267, Cl. 62-180.000.

Swanson, Kenneth R. Multidirectional animal trap. 4,040,201, Cl. 43-90.000.

Sweetheart Plastics, Inc.: *See*—
Shumrak, George; and Mack, Anthony, 4,041,277, Cl. 219-386.000.

Swift, David William, to Perkin-Elmer Limited. Polarized grating optical odometer. 4,040,741, Cl. 356-28.000.

Swindler, David L.; and Dykes, Donald L., to Square D Company. Interlock for circuit breakers. 4,041,260, Cl. 200-50.00A.

Syntex (U.S.A.) Inc.: *See*—
Nelson, Peter H.; and Untch, Karl G., 4,041,173, Cl. 424-308.000.

Syva Company: *See*—
Ullman, Edwin F.; and Rubenstein, Kenneth E., 4,040,907, Cl. 195-63.000.

Sze, Morgan C.; and Snell, George J., to Lummus Company, The. Separation of insoluble material from coal liquefaction product by use of a diluent. 4,040,957, Cl. 210-73.00R.

Szekely, Andrew Geza, to Union Carbide Corporation. Apparatus for refining molten metal. 4,040,610, Cl. 266-235.000.

Szivos, Karoly; Lovass, Gyula; Liptak, Laszlo; Hirling, Jozsef; and Pavlik, Ozskar, to Magyar Tudomanyos Akademia Izotop Intezete. Process and apparatus for the concentration and storage of liquid radioactive wastes. 4,040,973, Cl. 252-301.10W.

Szofran, Frank R.: *See*—
Bauer, Carl F.; Welsh, Lawrence B.; Youtsey, Karl J.; and Szofran, Frank R., 4,040,929, Cl. 204-195.00S.

Szymanski, Chester D.; and DeMartino, Ronald, to National Starch and Chemical Corporation. Wash-resistant antistatic coating compositions. 4,041,001, Cl. 260-29.6WA.

Tack, Hans, to Fried. Krupp Gesellschaft mit beschrankter. Adjusting device for milling cutters. 4,040,156, Cl. 29-96.000.

Tagawa, Katsuhiro, to Nisson Motor Company, Limited. Fuel tank pressure-vacuum relief valve. 4,040,404, Cl. 123-136.000.

Tagnon, Luc Andre, to Essilor International (Compagnie Generale d'Optique). Laser unit with a laser beam automatically aligned to the vertical direction. 4,040,752, Cl. 356-249.000.

Takada, Katsuo: *See*—
Kitamura, Nobuo; Takada, Katsuo; and Fukagawa, Hiroshi, 4,041,401, Cl. 325-455.000.

Takada, Koji; and Misu, Takashi, to Mitsubishi Denki Kabushiki Kaisha. Method of preventing pollution of sludge formed by electrolytic etching work. 4,040,920, Cl. 204-129.750.

Takada Koosuke: *See*—
Shitara, Hisao; and Takada Koosuke, 4,041,350, Cl. 315-39.750.

Takada, Tsutomu; Kato, Shingo; Utsunomiya, Tadashi; and Inoue, Sakae, to Bridgestone Tire Company Limited. Heat resistant rubber laminates. 4,041,207, Cl. 428-421.000.

Takahashi, Kenji: *See*—
Hinata, Masanao; Takei, Haruo; Miyasaka, Nobuaki; and Takahashi, Kenji, 4,040,833, Cl. 96-45.100.

Takahashi, Kozo: *See*—
Murakami, Masuo; Takahashi, Kozo; Hirata, Yasuhumi; Takashima, Mutsuo; Takeda, Masaaki; Ino, Hiroyoshi; and Iwanami, Sumio, 4,041,032, Cl. 260-250.0BN.

Takahashi, Masaru, to Mitsubishi Denki Kabushiki Kaisha. Control device for stopping the withdrawing of unit cases. 4,040,653, Cl. 292-202.000.

Takanashi, Itsuo: *See*—
Miyoshi, Tadayoshi; Nakagaki, Shintaro; Takanashi, Itsuo; Yokokawa, Sumio; Miyazaki, Kenichi; Tumiyama, Hisanori; and Motoyama, Koithiro, 4,041,528, Cl. 358-47.000.

Takashima, Mutsuo: *See*—
Murakami, Masuo; Takahashi, Kozo; Hirata, Yasuhumi; Takashima, Mutsuo; Takeda, Masaaki; Ino, Hiroyoshi; and Iwanami, Sumio, 4,041,032, Cl. 260-250.0BN.

Takayama, Jun: *See*—
Umeda, Kenkichi; Nakamura, Shoichi; Takayama, Jun; Horichi, Tetsuya; and Tsuchiya, Yoshikazu, 4,041,453, Cl. 340-146.1BE.

Takeda Chemical Industries, Ltd.: *See*—
Sugihara, Hirosada; Motohashi, Michio; Watanabe, Masazumi; Nishikawa, Masao; and Sanno, Yasushi, 4,041,079, Cl. 260-574.000.

Takeda, Masaaki: *See*—
Murakami, Masuo; Takahashi, Kozo; Hirata, Yasuhumi; Takashima, Mutsuo; Takeda, Masaaki; Ino, Hiroyoshi; and Iwanami, Sumio, 4,041,032, Cl. 260-250.0BN.

Takeda, Shiroh; Nagai, Yuji; and Suzuki, Takenori, to Fujitsu Limited. Process for producing anti-blocking and low pressure moldable diallyl phthalate resin molding materials. 4,041,009, Cl. 260-42.180.

Takei, Haruo: *See*—
Hinata, Masanao; Takei, Haruo; Miyasaka, Nobuaki; and Takahashi, Kenji, 4,040,833, Cl. 96-45.100.
Hinata, Masanao; Takei, Haruo; Sato, Akira; Ikeda, Tadashi; and Iwamoto, Atsuo, 4,040,841, Cl. 96-126.000.

Takeyasu, Kiyoo: *See*—
Inoyama, Tadao; Goto, Tatsuo; Takeyasu, Kiyoo; Ishimura, Hiroshi; and Suzuki, Junichi, 4,041,294, Cl. 235-151.110.

Takezaki, Tsuneo: *See*—
Yamazaki, Osamu; Miki, Sukeichi; and Takezaki, Tsuneo, 4,041,244, Cl. 179-15.0BT.

Takida, Hiroshi: *See*—
Amemiya, Kiyosi; and Takida, Hiroshi, 4,041,223, Cl. 526-10.000.

Takken, Hendrik J.: *See*—
Boelens, Harmannus; Takken, Hendrik J.; and Traas, Petrus C., 4,040,986, Cl. 252-522.000.

Talsma, Herbert; and Giffen, William M., Jr., to Standard Oil Company, The. Impact improvement of rubber-modified nitrile resins. 4,041,005, Cl. 260-32.80A.

Tamao, Yoshikuni: *See*—
Okamoto, Shosuke; Kikumoto, Ryoji; Ohkubo, Kazuo; Tezuka, Tohru; Tonomura, Shinji; Tamao, Yoshikuni; and Hijikata, Akiko, 4,041,156, Cl. 424-177.000.
Tanaka, Akira; and Ulrich, Charles J., to American Safety Equipment Corporation. Harness anchoring for child safety seat. 4,040,664, Cl. 297-389.000.
Tanaka, Eizi; Mochizuki, Hiroshi; Kosuda, Tooru; Abe, Seikou; and Ohashi, Michihiro, to Nippon Soken, Inc. Fuel injection system for internal combustion engine. 4,040,405, Cl. 123-139.0BG.
Tanaka, Harumi, to Minolta Camera Kabushiki Kaisha. Single lens reflex camera. 4,041,509, Cl. 354-152.000.
Tanaka, Masaaki: *See*—
Nohira, Hidetaka; Kobashi, Kiyoshi; and Tanaka, Masaaki, 4,040,402, Cl. 123-119.00A.
Tanaka, Michihiko: *See*—
Tsunashima, Kenji; Sugioka, Masanao; Soda, Atsuhiko; Ikeuchi, Hiroyuki; and Tanaka, Michihiko, 4,041,206, Cl. 428-409.000.
Tanaka, Tsutomu: *See*—
Ohta, Kazuho; Matsuda, Fumio; Tanaka, Tsutomu; Ohnuki, Katsuhiro; Miyaji, Naotaka; and Sato, Hidetoshi, 4,041,256, Cl. 179-182.00R.
Taniyama, Masayo. Cutter for cutting vegetables and fruits, the cutter having blades that are movable at the time of cutting. 4,040,319, Cl. 83-425.300.
Tantillo, James M.: *See*—
Ramsay, Donald C.; and Tantillo, James M., 4,040,697, Cl. 339-61.00R.
Tappan, Haroid B.; and Corwin, John Roy, to Eaton Corporation. Planetary reduction drive unit. 4,040,312, Cl. 74-801.000.
Tarancon, Gregorio: *See*—
Franklin, Robert E.; Francis, Arthur W.; and Tarancon, Gregorio, 4,041,136, Cl. 423-347.000.
Tarr, Lloyd Arthur: *See*—
Beeman, Robert Herbert; and Tarr, Lloyd Arthur, 4,041,248, Cl. 179-84.0VF.
Tashiro, Korefumi; and Ishikawa, Kosuke, to Hitachi, Ltd. Magnetic shield system for electric cars. 4,041,324, Cl. 307-91.000.
Tassone, Joseph V.: *See*—
Candor, James T.; and Tassone, Joseph V., 4,040,229, Cl. 53-29.000.
Tateno, Tatsuo: *See*—
Abe, Tatsuo; Okamoto, Toshiki; Sakakura, Takao; and Tateno, Tatsuo, 4,041,137, Cl. 423-489.000.
Tax, Hans; and Kurz, Herbert, to Tax, Hans. Apparatus for recovering particulate material from the sea bottom. 4,040,667, Cl. 299-8.000.
Taylor, Colin R.: *See*—
Perry, John H.; Salsburg, David S.; and Taylor, Colin R., 4,041,468, Cl. 364-900.000.
Taylor, George W.: *See*—
Kouchich, Allan; and Taylor, George W., 4,041,436, Cl. 338-21.000.
Taylor, Gerald Graham: *See*—
Rayner, Bruce Leland; and Taylor, Gerald Graham, 4,041,527, Cl. 358-22.000.
Taylor, James F.: *See*—
Shah, Niranjan S.; and Taylor, James F., 4,041,472, Cl. 364-900.000.
Taylor, John W., Jr.; and McGrew, Carl A., to Westinghouse Electric Corporation. Method and apparatus for determining the altitude of a signal propagation path. 4,041,491, Cl. 343-100.00R.
Taylor, Lauren P.; and Petroski, Alex, to LRS Research Limited. Catch basin processing apparatus. 4,040,960, Cl. 210-96.00R.
Taylor, Peter, to Munnis, David V. Spinning balance toy. 4,040,205, Cl. 46-51.000.
Taylor, Robert W., to Plysu Limited. Stripping flash from blow moulded hollow containers. 4,040,552, Cl. 225-1.000.
Taylor, Steve: *See*—
Kirkland, Joe D., Jr., 4,040,486, Cl. 166-311.000.
Tchon, Wallace Edward, to Honeywell Information Systems Inc. Uniphase charge transfer device. 4,041,520, Cl. 357-24.000.
Tecco, Charles, to Weatherchem Corporation. Injection molding machine. 4,040,595, Cl. 249-68.000.
Technicon Instruments Corporation: *See*—
Kim, Young Ran; Ornstein, Leonard; and Waters, Henry Cook, III, 4,040,785, Cl. 23-230.00B.
Teitel, Sidney: *See*—
Christenson, James Gordon; Gurien, Harvey; and Teitel, Sidney, 4,041,040, Cl. 260-292.000.
Tekken Kensetu Co. Ltd.: *See*—
Uchida, Yoshiaki; and Ishiwata, Kazuhiko, 4,040,666, Cl. 299-1.000.
Telefonaktiebolaget L M Ericsson: *See*—
Gabrielsson, Arne Goran; and Lindstrom, Jan Erik, 4,041,417, Cl. 331-107.00R.
Gravdahl, Eugen, 4,041,458, Cl. 340-166.00R.
Nordblad, Sven Sigurd; and Svensson, Karl-Erik, 4,040,269, Cl. 62-374.000.
Telic Corporation: *See*—
Penfold, Alan S.; and Thornton, John A., 4,041,353, Cl. 315-267.000.
Telle, Byron J.; and Sudyk, John R., to Johnson Rubber Company, The. Keel cooler with spiral fluted tubes. 4,040,476, Cl. 165-76.000.
Teng, James: *See*—
Stubits, Marcella C.; and Teng, James, 4,041,179, Cl. 426-3.000.
Tenna Corporation: *See*—
Freimark, Ronald J.; and Repay, Laszlo N., 4,041,498, Cl. 343-749.000.
Terada, Ziro: *See*—
Nitta, Tsuneharu; Hayakawa, Shigeru; Kasahara, Yukio; and Terada, Ziro, 4,041,140, Cl. 423-561.00R.
Teramachi, Hiroshi. Slide way bearing. 4,040,679, Cl. 308-6.00C.
Terasaki, Osamu: *See*—
Kikuchi, Yasuo; Ohmichi, Yasuyuki; Terasaki, Osamu; and Sakai, Koichi, 4,041,428, Cl. 335-210.000.
Terwilliger, Gerald R.: *See*—
Lange, Frederick F.; and Terwilliger, Gerald R., 4,041,123, Cl. 264-332.000.
Tesla, narodni podnik: *See*—
Kupec, Jiri; and Hrdlicka, Rehor, 4,041,384, Cl. 324-73.0PC.
Texaco Development Corporation: *See*—
Marquis, Edward T.; and Watts, Lewis W., Jr., 4,041,078, Cl. 260-570.00D.
Texas Instruments Incorporated: *See*—
Liu, Charles Chung-Yeh; and Fuller, James Alec, 4,041,499, Cl. 343-756.000.
Yarworth, Norman; and Pejouhy, Radi, 4,041,432, Cl. 337-111.000.
Textron, Inc.: *See*—
Mast, John G., 4,041,493, Cl. 343-106.00R.
Matt, Richard J.; and Thompson, Richard T., 4,040,883, Cl. 156-148.000.
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Fetherston, William H.; and Theriault, Maurice N., 4,040,137, Cl. 9-310.0AA.
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Angott, Paul G., 4,041,325, Cl. 307-141.000.
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Thigpen, Ben B., to Western Geophysical Co. of America. Seismic recording apparatus having a time-varying sample. 4,041,443, Cl. 340-15.5AF.
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Miller, Dale E.; Chapman, William L.; Dunster, Donald E.; and Thomas, Bobby J., 4,041,372, Cl. 324-9.000.
Thomas, Harold D., to Tri Tractor Manufacturing Co., Inc. Tractor. 4,040,497, Cl. 180-53.00R.
Thomas, Paul Dana; and Burton, Dale Leroy, to Data Test Corporation. Multifunctional circuit analyzer. 4,041,386, Cl. 324-77.00R.
Thomas, Robert M., to GTE Automatic Electric (Canada) Ltd. Sense point circuit. 4,041,327, Cl. 307-231.000.
Thompson, Arthur David, to Dobson Park Industries Limited. Mounting arrangements for mineral displacing tools. 4,040,584, Cl. 248-2.000.
Thompson, Neil E. S.: *See*—
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Thompson, Richard T.: *See*—
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Chabanel, Pierre, 4,041,534, Cl. 358-186.000.
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Dubois, Jean-Claude; and Gazard, Maryse, 4,041,190, Cl. 427-43.000.
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Thornton, Sidney. Collapsible bucket. 4,040,460, Cl. 150-48.000.
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Tiberio, Phillip J.: *See*—
McBride, Robert B.; and Tiberio, Phillip J., 4,040,790, Cl. 23-253.00C.
Tikusa, Kouiti: *See*—
Isogai, Mitsuyuki; Tikusa, Kouiti; and Nakamura, Yosihiko, 4,040,162, Cl. 29-420.500.
Timex Corporation: *See*—
Salin, Jean Claude, 4,041,214, Cl. 429-98.000.
Timm, Walter C.: *See*—
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Tines, Antonie, legal representative: *See*—
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Tines, Josef, deceased: *See*—
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Kitamura, Koji, 4,040,863, Cl. 134-3.000.
Tokunaga, Koichi; and Fukuda, Akira, to Mitsui Mining & Smelting Co., Ltd. Method and apparatus for stacking ingots according to predetermined arrangements. 4,040,525, Cl. 214-6.00P.
Tokunaga, Michio: *See*—
Ohhinata, Ichiro; Okuhara, Shinzi; and Tokunaga, Michio, 4,041,332, Cl. 307-252.00J.
Tokyo Shibaura Electric Co., Ltd.: *See*—
Fuse, Noboru; and Muramoto, Kenichi, 4,041,517, Cl. 357-22.000.
Shitara, Hisao; and Takada Koosuke, 4,041,350, Cl. 315-39.750.
Toman, Donald J., to Tull Aviation Corporation. Radio navigation with separate correlated scans to avoid reflection interference. 4,041,492, Cl. 343-106.00R.
Tomita, Hitoshi, to Diesel Kiki Co., Ltd. Fuel injection valve for internal combustion engine. 4,040,396, Cl. 123-32.0JV.
Tomita, Shuzo. Portable container for fish, live bait, and the like. 4,040,200, Cl. 43-57.000.
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Kimura, Osamu, 4,040,206, Cl. 46-138.000.
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Tootal Limited: *See*—
Wilson, Thomas William; and Topham, Michael Johnston, 4,040,496, Cl. 177-105.000.
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Wilson, Thomas William; and Topham, Michael Johnston, 4,040,496, Cl. 177-105.000.
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Fujioka, Kotaro; Tsuchihashi, Osami; Endo, Tetsuhiko; and Hirota, Masakazu, 4,040,240, Cl. 57-34.0CP.
Tsunashima, Kenji; Sugioka, Masanao; Soda, Atsuhiko; Ikeuchi, Hiroyuki; and Tanaka, Michihiko, 4,041,206, Cl. 428-409.000.
Torokvei, Thomas Evald, to Scepter Manufacturing Company Limited. Stacking case. 4,040,517, Cl. 206-144.000.
Torre, Anthony J.: *See*—
Hayosh, Thomas D.; and Torre, Anthony J., 4,041,322, Cl. 250-568.000.
Torrington Company Limited, The: *See*—
Lewis, Terence John; Brooks, Raymond; and Selby, John, 4,040,336, Cl. 90-11.00R.
Tost, Heinrich, to Grundig E.M.V. Elektro-Mechanische Versuchsanstalt Max Grundig. Apparatus for depositing flux-fluid onto conductor plates. 4,040,385, Cl. 118-326.000.
Totsuka Komuten Co., Ltd.: *See*—
Totsuka, Yasutaro, 4,040,215, Cl. 52-168.000.
Totsuka, Yasutaro, to Totsuka Komuten Co., Ltd. Decay-resisting construction of lower structure for wooden buildings. 4,040,215, Cl. 52-168.000.
Towersey, Peter John; Longton, John; and Cockram, Geoffrey Norman, to Ranks Hovis McDougall Limited. Production of edible protein containing substances. 4,041,189, Cl. 426-656.000.
Towsend, Marvin Stanley. Magnetic stirring apparatus. 4,040,605, Cl. 259-64.000.
Toyama, Toshiaki: *See*—
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Toyo Soda Manufacturing Co., Ltd: *See*—
Kikuchi, Mitsuo; and Hiraga, Yoichi, 4,041,134, Cl. 423-321.00S.
Toyota Jidosha Kogyo Kabushiki Kaisha: *See*—
Nohira, Hidetaka; Kobashi, Kiyoshi; and Tanaka, Masaaki, 4,040,402, Cl. 123-119.00A.
Traas, Petrus C.: *See*—
Boelens, Harmannus; Takken, Hendrik J.; and Traas, Petrus C., 4,040,986, Cl. 252-522.000.
Tracey, Robert J.: *See*—
Boleda, Alberto; and Tracey, Robert J., 4,041,484, Cl. 340-347.0NT.
Transco Energy Company: *See*—
Cook, Harold L., Jr.; Geer, Ernest C.; and Katz, Donald L., 4,040,487, Cl. 166-314.000.
Tri-Tech, Inc.: *See*—
Haydon, Arthur W., 4,040,247, Cl. 58-23.00R.
Tri Tractor Manufacturing Co., Inc.: *See*—
Thomas, Harold D., 4,040,497, Cl. 180-53.00R.
Triple-S Development Co., Inc.: *See*—
Smith, Jessop; and Kocis, Thomas Robert, 4,040,196, Cl. 42-23.000.
Triquet, Fred E.: *See*—
Olmstead, Clarence W.; and Triquet, Fred E., 4,041,241, Cl. 174-153.00G.
Trivedi, Ramesh C.; Bungay, Henry R., III; and Cuccolo, Paul J., to Worthington Biochemical Corporation. Chemical analysis method using reaction container. 4,040,786, Cl. 23-230.00R.
Tronsberg, Walter, to Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft. Method for making a container of composite material. 4,040,163, Cl. 29-423.000.
Trost, Wayne C.; and Capps, John B., to Barber-Colman Company. Triaxial weaving machine having heddles with weftwise lateral projections. 4,040,451, Cl. 139-48.000.
Trotnick, Vincent William, Jr., to RCA Corporation. Push-pull audio amplifier system with muting. 4,041,408, Cl. 330-15.000.
Trunk, Edmund G.; and Skrobisch, Alfred, to Staver Company, Inc., The. Heat dissipating device for transistor with outwardly extending heat conductive tab. 4,041,524, Cl. 357-81.000.
TRW Canada Limited: *See*—
Donegan, Edward Alfred, 4,040,756, Cl. 403-307.000.
TRW Inc.: *See*—
Andrews, James D., 4,040,933, Cl. 204-224.00M.
McKee, William H.; and Witte, Roy, 4,040,702, Cl. 339-97.00R.
Rogers, Wilford P., 4,040,687, Cl. 308-201.000.
Tsuchihashi, Osami: *See*—
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Tsuchiya, Yoshikazu: *See*—
Umeda, Kenkichi; Nakamura, Shoichi; Takayama, Jun; Horichi, Tetsuya; and Tsuchiya, Yoshikazu, 4,041,453, Cl. 340-146.1BE.
Tsuda, Naotsune, to Olympus Optical Co., Ltd. Method of manufacturing magnetic heads. 4,040,174, Cl. 29-603.000.
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Tsuneda, Terukuni, to Canon Kabushiki Kaisha. Liquid developer for developing an electrostatic latent image. 4,040,970, Cl. 252-62.10L.
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Kampf, Julian C.; Lemke, Winfred R.; and Tucker, James T., 4,041,540, Cl. 361-24.000.
Tull Aviation Corporation: *See*—
Toman, Donald J., 4,041,492, Cl. 343-106.00R.
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Tummes, Hans: *See*—
Bexten, Ludger; Noeske, Heinz; Tummes, Hans; and Cornils, Boy, 4,041,081, Cl. 260-601.00R.
Gothel, Herbert; Cornils, Boy; Feichtinger, Hans; Tummes, Hans; and Falbe, Jurgen, 4,041,080, Cl. 260-585.00B.
Turner, Earl E.: *See*—
Behrmann, William C.; Turner, Earl E.; and Bastron, Victor C., 4,041,100, Cl. 260-683.470.
Tuzson, John J., to Borg-Warner Corporation. Oil-water interface control for submersible electric motor. 4,040,773, Cl. 417-424.000.
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Jenkins, Francis Edward; and Tynan, Daniel Gregory, 4,041,115, Cl. 264-5.000.
Tyson, George Noblit: *See*—
Austin, Robert Roy; and Tyson, George Noblit, 4,040,342, Cl. 99-323.100.
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Ghosez, Leon; Rossey, Guy; and Didderen, Freddy, 4,041,077, Cl. 260-562.00R.
Uchida, Isamu; Kokubo, Eiichi; and Yoshida, Minoru, to Laurel Bank Machine Co., Ltd. Leaves counting machine. 4,041,282, Cl. 235-98.00R.
Uchida, Yoshiaki; and Ishiwata, Kazuhiko, to Tekken Kensetu Co. Ltd. Apparatus and method of shield excavation. 4,040,666, Cl. 299-1.000.
Uchio, Ryosuke; Kikuchi, Kenji; Asai, Soichiro; and Yarita, Kenichi, to Ajinomoto Co., Inc. Method of producing carbon source for citric acid fermentation. 4,040,906, Cl. 195-36.00R.
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Ohmatsu, Hideki; and Ueda, Hirozo, 4,040,829, Cl. 96-6.000.
Ullman, Edwin F.; and Rubenstein, Kenneth E., to Syva Company. Iodothyronine enzyme conjugates. 4,040,907, Cl. 195-63.000.
Ullrich, Martin, to Bayer Aktiengesellschaft. Method of building up pressure by multi-shaft screw extruders. 4,040,607, Cl. 259-192.000.
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Umeda, Kaoru, to Sony Corporation. Control circuit for actuating a de ice at a delayed time with respect to the turning on of a power supply and for deactuating the device substantially simultaneously with the turning off of the power supply. 4,041,334, Cl. 307-293.000.
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Maekawa, Yukio; Satomura, Masato; and Umehara, Akira, 4,041,017, Cl. 260-47.0UA.
Unican Electrochemical Products Ltd.: *See*—
Wiacek, Marian, 4,041,211, Cl. 429-36.000.
Union Camp Corporation: *See*—
Giebel, Buddy E., 4,040,559, Cl. 229-23.00R.
Union Carbide Corporation: *See*—
Engel, Stephen August, 4,040,871, Cl. 148-9.500.
Franklin, Robert E.; Francis, Arthur W.; and Tarancon, Gregorio, 4,041,136, Cl. 423-347.000.
Merkert, Rodney Francis, 4,040,814, Cl. 75-.5BC.
Szekely, Andrew Geza, 4,040,610, Cl. 266-235.000.
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Kelley, Arnold E.; Reeg, Cloyd P.; Wood, Frederick C.; and Cheadle, George D., 4,040,944, Cl. 208-89.000.
Young, Dean Arthur, 4,040,797, Cl. 44-68.000.
Young, Donald C., 4,041,133, Cl. 423-305.000.
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Loveless, Frederick C., 4,041,098, Cl. 260-683.15D.
O'Shea, Francis X.; and Mao, Chung-Ling, 4,041,105, Cl. 260-859.00R.
Unitech Chemical Inc.: *See*—
Lewis, Morton; and Rohrer, John F., 4,040,994, Cl. 260-18.0PF.

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Campbell, George W., Jr.; Wilkins, David G.; and Muench, Jerome T., 4,041,132, Cl. 423-279.000.
United States of America
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Eby, Harry J.; and Morgan, Neal O., 4,040,810, Cl. 71-9.000.
Weller, Heber W., Jr., 4,040,243, Cl. 57-58.890.
Army: *See*—
Blajda, Raymond S.; Kantenwein, Robert W.; Gaughan, Gerald E.; and Sikra, John F., 4,040,359, Cl. 102-93.000.
Border, Robert O.; and Rudman, Ronald H., 4,040,332, Cl. 89-37.00F.
F'Geppert, Erwin, 4,040,647, Cl. 280-766.000.
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Moore, Thomas M., 4,040,577, Cl. 244-4.00A.
Saunders, William K., 4,040,357, Cl. 102-70.20P.
Stern, Allen E., 4,040,354, Cl. 102-8.000.
Voreck, Wallace E., Jr.; and Dalrymple, Everett W., 4,040,356, Cl. 102-28.00R.
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Dyer, Robert H.; Fowler, Andrew H.; and Vanstrum, Paul R., 4,040,801, Cl. 55-16.000.
Monroe, James E., Jr., 4,040,903, Cl. 176-39.000.
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Petricciani, John C.; Hopps, Hope E.; Lorenz, Douglas E.; Vasington, Paul J.; and Wallace, Roslyn E., 4,040,905, Cl. 195-1.800.
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Bier, Milan, 4,040,940, Cl. 204-299.00R.
Ito, Yoichiro; and Carmeci, Peter, 4,040,742, Cl. 356-39.000.
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Zwiener, James M., 4,040,750, Cl. 356-212.000.
Navy: *See*—
Bauer, Peter W.; and Paulson, Merle R., 4,041,397, Cl. 325-304.000.
Bond, James W., 4,041,284, Cl. 235-150.500.
Johnson, Clarence S., 4,041,441, Cl. 340-3.00R.
Lapp, Roger H., 4,041,500, Cl. 343-761.000.
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McKinney, Maurice E., 4,040,579, Cl. 244-214.000.
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Rothenstein, Julius; and Zimmerman, G. A., 4,040,880, Cl. 149-76.000.
Transportation: *See*—
Ewen, Harold I.; and Haroules, George G., 4,041,494, Cl. 343-112.00D.
U.S. Philips Corporation: *See*—
Beeler, Alfred; and van der Mijden, Wilhelmus Marinus Cornelius, 4,040,177, Cl. 29-630.00C.
De Boer, Wilhelmus Johannes; Schinkel, Willem; and Span, Francis Johannes, 4,040,533, Cl. 214-310.000.
De Bresser, Gijsbert Frederik Maria; Kassenaar, Teunis Adrianus; Veraa, Ludovicus-Gerardus Johannes Godefrida; and Weenink, Leon Pieter, 4,040,706, Cl. 339-103.00R.
Freudeberg, Jurgen; and Von Osten, Reimer, 4,041,482, Cl. 340-324.0AD.
Hight, Michael John; Winkle, Roy Victor; and Dale, John Robert, 4,040,885, Cl. 156-378.000.
Holster, Peter Leendert; Ooms, Adam; and van den Hoogen, Marinus Johannes Gerardus, 4,040,290, Cl. 73-71.000.
Kaanders, Johannes Matheus Gerardus Maria, 4,041,251, Cl. 179-107.0FD.
Karsmakers, Mathijs Antonius; and Somers, Gerardus Henricus Johannus, 4,040,297, Cl. 73-398.0AR.
Koster, Marinus Pieter, 4,040,307, Cl. 74-425.000.
Kramer, Pieter; Compaan, Klaas; and Forsthuber, Robert Franz Karl, 4,041,530, Cl. 358-128.000.
Le Can, Claude Jan Principe Frederik, 4,041,474, Cl. 340-173.00R.
Rowe, Colin M., 4,040,878, Cl. 148-188.000.
van den Enden, Adrianus Wilhelmus Maria; Kuipers, Franciscus Antonius; de Niet, Edmond; and Druyvesteyn, Willem Frederik, 4,041,478, Cl. 340-174.0TF.
van der Heide, Hendrik, 4,040,681, Cl. 308-10.000.
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Dierberger, James Albert; and White, Loren Hawdon, 4,040,767, Cl. 415-115.000.
Kelch, George W., 4,040,161, Cl. 29-239.000.
Mosier, Stanley A.; and Pierce, Robert M., 4,040,252, Cl. 60-39.360.
Van Dine, Leslie L., 4,041,210, Cl. 429-16.000.
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Bauer, Carl F.; Welsh, Lawrence B.; Youtsey, Karl J.; and Szofran, Frank R., 4,040,929, Cl. 204-195.00S.
University of Illinois Foundation, The: *See*—
Nelson, Alvin I.; Steinberg, Marvin P.; and Wei, Lun-Shin, 4,041,187, Cl. 426-598.000.
Unsworth, William: *See*—
Clegg, Gordon A.; Cull, Geoffrey Maurice; Fisher, Phillip Andrew; and Unsworth, William, 4,040,818, Cl. 75-58.000.
Untch, Karl G.: *See*—
Nelson, Peter H.; and Untch, Karl G., 4,041,173, Cl. 424-308.000.
UOP Inc.: *See*—
Antos, George J., 4,041,092, Cl. 260-673.500.
Campbell, Bonnie J.; and Rieger, Klaus R., 4,040,479, Cl. 165-133.000.
Christman, William J., 4,040,947, Cl. 208-235.000.
Dillon, James E., 4,040,930, Cl. 204-195.00S.
Forbes, James T., 4,041,131, Cl. 423-242.000.
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Henry, Michel Jacques, 4,041,091, Cl. 260-672.00T.
Hogan, Gerard T.; and Weik, Kirby B., 4,040,661, Cl. 297-284.000.
Poulsen, Harold W., 4,041,318, Cl. 250-459.000.
Sobel, Jay E., 4,041,101, Cl. 260-683.510.
Stolfa, Frank, 4,040,943, Cl. 208-80.000.
Stone, Richard D., 4,040,794, Cl. 23-288.00G.
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Samuelsson, Bengt; and Magerlein, Barney J., 4,041,066, Cl. 260-468.00D.
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Urdaneta, Nelson: *See*—
Conway, Arch W.; and Urdaneta, Nelson, 4,041,288, Cl. 235-151.310.
Usardi, Maria M.: *See*—
Gandolfi, Carmelo; Doria, Gianfederico; Pellegata, Renato; and Usardi, Maria M., 4,041,064, Cl. 560-121.000.
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Ushio, Hiroyuki: *See*—
Atsukawa, Masumi; Kamei, Kazumi; Shinoda, Naoharu; and Ushio, Hiroyuki, 4,040,803, Cl. 55-73.000.
Usui, Kunichika: *See*—
Nakamura, Akihisa; Kamezaki, Takashi; Naito, Kenji; and Usui, Kunichika, 4,041,112, Cl. 261-72.00R.
Utamura, Yukihiko: *See*—
Eto, Goro; and Utamura, Yukihiko, 4,041,348, Cl. 313-497.000.
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Takada, Tsutomu; Kato, Shingo; Utsunomiya, Tadashi; and Inoue, Sakae, 4,041,207, Cl. 428-421.000.
Valeron Corporation, The: *See*—
Bellingham, Robert Aldred, 4,040,315, Cl. 82-2.00E.
Valleylab, Inc.: *See*—
Morrison, Charles F., Jr., 4,040,426, Cl. 128-303.170.
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Beeler, Alfred; and van der Mijden, Wilhelmus Marinus Cornelius, 4,040,177, Cl. 29-630.00C.
van der Veek, Augustinus Petrus Maria, to Philips-Duphar B.V. Selenyl and telluryl derivatives of steroids. 4,041,145, Cl. 424-1.000.
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Van Dine, Leslie L., to United Technologies Corporation. Pressurized high temperature fuel cell power plant with bottoming cycle. 4,041,210, Cl. 429-16.000.
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Van Rheenen, Verlan H.: *See*—
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Van Strien, Richard E.: *See*—
Lindberg, Steven E.; Marchant, Kerford A., Jr.; and Van Strien, Richard E., 4,041,065, Cl. 260-47.0CZ.

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Sudler, Roland; and Hartung, Klaus-Dieter, 4,041,336, Cl. 310-49.00R.

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Johne, Hans; Jentzsch, Arndt; Schumann, Gunter; Reichenberger, Roland; Kesselring, Horst; and Fischer, Karl-Heinz, 4,040,347, Cl. 101-349.000.

VEB Textilkombinat: *See*—
Heger, Adolf; Passler, Helmar; and Bennemann, Frank, 4,041,192, Cl. 427-43.000.

Vedda, Louis: *See*—
Alberny, Robert; and Vedda, Louis, 4,040,467, Cl. 164-49.000.

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Albright, James A.; and Lindvay, Michael W., 4,041,012, Cl. 260-45.80A.
Anderson, Arnold L., 4,041,013, Cl. 260-45.75R.
Krenzer, John, 4,040,812, Cl. 71-90.000.

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Fastner, Thorwald, 4,040,470, Cl. 164-58.000.

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Helbig, Joachim; and Fischer, Franz, 4,041,154, Cl. 424-150.000.

Vermes, Roy E.; and Cosby, Richard E., to Revco, Inc. Sheet stacking apparatus. 4,040,618, Cl. 271-182.000.

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Adelmann, Siegfried; Margotte, Dieter; Vernaleken, Hugo; Niederprum, Hans; Meussdoerffer, Johann Nikolaus; and Nouvertne, Werner, 4,041,003, Cl. 260-30.80R.
Binsack, Rudolf; and Vernaleken, Hugo, 4,041,018, Cl. 260-75.00R.

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Gauriat, Gilles; Vernezy, Jacques; and Barigot, Jean-Claude, 4,041,392, Cl. 325-38.00A.

Vernois, Michel: *See*—
Francois, Bernard; Vernois, Michel; Martin, Paul; and Franta, Emile, 4,040,815, Cl. 75-.50B.

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Vickery, Warren J. Magazine rack. 4,040,522, Cl. 211-88.000.

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Miyoshi, Tadayoshi; Nakagaki, Shintaro; Takanashi, Itsuo; Yokokawa, Sumio; Miyazaki, Kenichi; Tumiyama, Hisanori; and Motoyama, Koithiro, 4,041,528, Cl. 358-47.000.
Ohta, Kazuho; Matsuda, Fumio; Tanaka, Tsutomu; Ohnuki, Katsuhiro; Miyaji, Naotaka; and Sato, Hidetoshi, 4,041,256, Cl. 179-182.00R.

Vig, Istvan, to Merz AG Dulliken. Reamer. 4,040,765, Cl. 408-239.00A.

Villari, Frank K.: *See*—
Libman, Gary; and Villari, Frank K., 4,040,909, Cl. 195-127.000.

Villaume, Henry F.; Collins, D. Stephen; and Peoples, Patrick J., to Howell Laboratories, Incorporated. Method and apparatus for measuring the brightness of pulp slurry. 4,040,743, Cl. 356-73.000.

Vinals, Joaquin: *See*—
Hall, John B.; Hruza, Denis E.; Vock, Manfred Hugo; Vinals, Joaquin; and Shuster, Edward J., 4,041,069, Cl. 260-486.00R.

Vinals, Joaquin F.: *See*—
Light, Kenneth K.; Shuster, Edward J.; Vinals, Joaquin F.; and Vock, Manfred Hugo, 4,041,084, Cl. 260-617.00F.

Vincent, George C.; and Rauch, David, to Kingsford Company, The. Fast lighting artificial firelog. 4,040,796, Cl. 44-14.000.

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Abblard, Jean; Marmain, Georges; and Viricel, Andree, 4,041,109, Cl. 260-927.00R.

Vitale, Gina G.: *See*—
LeGrand, Donald G.; and Vitale, Gina G., 4,040,882, Cl. 156-106.000.

Vlattas, Isidoros, to Ciba-Geigy Corporation. 9-Thiaprostaglandins. 4,041,047, Cl. 260-332.100.

Vock, Manfred Hugo: *See*—
Evers, William J.; Heinsohn, Howard H., Jr.; Vock, Manfred Hugo; and Giacino, Christopher, 4,041,186, Cl. 426-535.000.
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Becker, Burckhard, 4,040,646, Cl. 280-750.000.
Decker, Gerd; Steinke, Dieter; and Reichel, Kurt, 4,040,393, Cl. 123-30.00A.

Vollmer, Karl-Otto: *See*—
Satzinger, Gerhard; Herrmann, Manfred; and Vollmer, Karl-Otto, 4,041,166, Cl. 424-267.000.

Volpe, Giancarlo: *See*—
Assandri, Alessandro; Lancini, Giancarlo; Volpe, Giancarlo; and Cavalleri, Bruno, 4,041,168, Cl. 424-273.000.

Vonder, David L.: *See*—
Brush, Douglas J.; Vonder, David L.; and Wilkis, Anthony J., 4,041,425, Cl. 335-129.000.

Von Osten, Reimer: *See*—
Freudeberg, Jurgen; and Von Osten, Reimer, 4,041,482, Cl. 340-324.0AD.

Voreck, Wallace E., Jr.; and Dalrymple, Everett W., to United States of America, Army. Converging wave detonator. 4,040,356, Cl. 102-28.00R.

Voss, Eitel; Waldofner, Karl-Heinz; and Harz, Kurt, to August Thyssen-Hutte AG. Use of the continuous blast furnace gas analysis for supervision and regulation of the blast furnace operation. 4,040,789, Cl. 23-230.00A.

Vyzkumny ustav bavlnarsky: *See*—
Burysek, Frantisek; Mikulecky, Karel; and Janousek, Jan, 4,040,573, Cl. 242-35.50A.

W. B. Marvin Mfg. Co.: *See*—
Johnson, James B.; and Henson, Jesse L., 4,040,498, Cl. 180-68.00P.

W. Haking Industries, Ltd.: *See*—
Chan, Kwok Yan; and Ko, Norman Wah Man, 4,041,507, Cl. 354-64.000.

W. R. Grace & Co.: *See*—
Simons, Charles W.; O'Neill, Gerald J.; and Gribens, Joel A., 4,041,148, Cl. 424-45.000.

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van den Broek, Adriaan, 4,040,190, Cl. 34-11.000.

WABCO Westinghouse: *See*—
Marcillaud, Roger, 4,040,674, Cl. 303-22.00R.

WABCO Westinghouse GmbH: *See*—
Ahaus, Gerhard; Netzer, Siegfried; and Liebig, Hans-Peter, 4,040,673, Cl. 303-6.00C.
Gottling, Helmut, 4,040,437, Cl. 137-102.000.

Wada, Yukio; Abura, Yoshinori; and Matsui, Takeshi, to Matsushita Electric Works, Ltd. Electric device having rotary current collecting means. 4,040,696, Cl. 339-8.00R.

Waddington, William T.; Jenkins, Harold F.; and Filak, Paul T., to Amerace Corporation. Tubular electrical connector. 4,040,711, Cl. 339-198.00R.

Waeldner, William J.; and Harris, William J., to Dynamics Corporation of America. System powered damper and control unit. 4,040,564, Cl. 236-49.000.

Wagner, Herbert A., to Gulton Industries, Inc. Railroad track profile spacing and alignment apparatus. 4,040,738, Cl. 356-1.000.

Wagner, John Francis: *See*—
Kahan, William; Rupinski, Fredrick Alexander; Wagner, John Francis; and Peer, Thomas Richard, 4,040,277, Cl. 66-154.00A.

Wagner, Joseph E., III: *See*—
Williams, Lloyd E.; Mays, Robert K.; and Wagner, Joseph E., III, 4,041,135, Cl. 423-329.000.

Wahl, Josef; Schmidt, Peter Jurgen; and Zechnall, Richard, to Robert Bosch GmbH. Apparatus repetitively controlling the composition of exhaust emissions from internal combustion engines, in predetermined intervals. 4,040,394, Cl. 123-32.0EA.

Wakiyama, Yoshinori: *See*—
Inaba, Hideya; Ichiki, Masayoshi; and Wakiyama, Yoshinori, 4,040,981, Cl. 252-463.000.

Walasewicz, Stanley John; Erickson, Virgil William; Harrison, Robert Adams; and Houghton, Royal Elwin, to Bryant Grinder Corporation. Grinding wheel truing mechanism. 4,040,409, Cl. 125-11.0AS.

Walden, John P., to General Electric Company. DC to AC inverter having improved switching efficiency, overload and thermal protection features. 4,041,544, Cl. 361-106.000.

Waldofner, Karl-Heinz: *See*—
Voss, Eitel; Waldofner, Karl-Heinz; and Harz, Kurt, 4,040,789, Cl. 23-230.00A.

Walendziewicz, Eugene T.: *See—*
Kratz, Gary L.; Sproul, William W., III; Walendziewicz, Eugene T.; Wallis, Donald E.; and Dennis, Charles A., 4,041,461, Cl. 364-200.000.

Walk, Howard J.; and Rollins, Dallas W., to ACF Industries, Incorporated. Combination hatch covers. 4,040,363, Cl. 105-377.000.

Walker, Frederick J.: *See—*
Rolt, Anthony P. R.; Walker, Frederick J.; and Webb, Oswald, 4,040,271, Cl. 64-26.000.

Walker, Ronald Jay; Sherwin, Dewayne James; and Rumpf, Robert John, to Firestone Tire & Rubber Company, The. Retractor lock and pawl saddle therefor. 4,040,576, Cl. 242-107.40A.

Walkington, Colin, to Masson Scott Thrissell Engineering Limited. Sheet feeding apparatus. 4,040,617, Cl. 271-177.000.

Wallace, Earl C.; and Bell, Richard A., to General Engineering & Mfg. Corporation. Arm rest assembly for seating structures. 4,040,665, Cl. 297-417.000.

Wallace, Earl C., to General Engineering & Manufacturing Corporation. Method of forming tufted cushion elements. 4,040,881, Cl. 156-93.000.

Wallace, Roslyn E.: *See—*
Petricciani, John C.; Hopps, Hope E.; Lorenz, Douglas E.; Vasington, Paul J.; and Wallace, Roslyn E., 4,040,905, Cl. 195-1.800.

Wallis, Donald E.: *See—*
Kratz, Gary L.; Sproul, William W., III; Walendziewicz, Eugene T.; Wallis, Donald E.; and Dennis, Charles A., 4,041,461, Cl. 364-200.000.

Walls, Leroy C., to Lewals, Inc. Disc advancing and metering device. 4,040,513, Cl. 198-530.000.

Walon, Raoul G. P., to CPC International Inc. Process of refining enzymatically produced levulose syrups. 4,040,861, Cl. 127-46.00A.

Walters, James H. Animal feeding device. 4,040,389, Cl. 119-52.00R.

Walworth, Bryant Leonidas: *See—*
Cross, Barrington; and Walworth, Bryant Leonidas, 4,041,046, Cl. 548-375.000.

Wang, Hsug-Fang: *See—*
Lee, Char-Shin; and Wang, Hsug-Fang, 4,040,298, Cl. 73-406.000.

Wang, Richard H. S.; Newland, Gordon C.; and Pacifici, James G., to Eastman Kodak Company. Photopolymerizable polymeric compositions containing halogen containing heterocyclic compound. 4,040,922, Cl. 204-159.150.

Wang, Richard Hsu-Shien: *See—*
Pond, David Martin; and Wang, Richard Hsu-Shien, 4,041,011, Cl. 260-45.8NT.

Ward, Gregory A.; and Casey, Lawrence P., III, to Casard Industries, Inc. Plastic bag and carrier handle. 4,040,562, Cl. 229-54.00R.

Warner-Lambert Company: *See—*
Fabian, Arthur C.; Genzer, Jerome D.; Kasulanis, Charles Francis; Shavel, John, Jr.; and Zinnes, Harold, 4,041,042, Cl. 260-301.000.
Satzinger, Gerhard; Herrmann, Manfred; and Vollmer, Karl-Otto, 4,041,166, Cl. 424-267.000.

Warrick, Robert J.: *See—*
Hetke, Adolf; Mohla, Prem P.; and Warrick, Robert J., 4,040,821, Cl. 75-134.00S.

Wasag Chemie GmbH: *See—*
Wiedemann, Wolfgang; and Platte, Friedrich, 4,040,570, Cl. 241-3.000.

Washall, Thomas A., to Atlantic Richfield Company. Recovery of selenium from urethane solutions. 4,041,139, Cl. 423-508.000.

Washburn, Ralph G., to Sippican Corporation, The. Calibrating a measurement system including bridge circuit. 4,041,382, Cl. 324-65.00R.

Washio, Takaji; Sasaki, Koichi; and Aizawa, Tatsuo, to Mita Industrial Co. Ltd. Electrostatic photographic copying apparatus. 4,040,387, Cl. 118-658.000.

Wason, Satish K., to J. M. Huber Corporation. Preparation of precipitated silicas having controlled refractive index. 4,040,858, Cl. 106-288.00B.

Watanabe, Haruo; Kitagawa, Toru; Negishi, Masaaki; Aonuki, Kiichi; and Kobayashi, Harunobu, to Showa Sangyo Co. Ltd. Method of improving the oxidation resistance of an oil or fat. 4,041,059, Cl. 260-424.000.

Watanabe, Kenkichi; and Ohsako, Kyoichi, to Laurel Bank Machine Co., Ltd. Device for detecting stack of coins for use in coins-packaging machine. 4,040,434, Cl. 133-1.00A.

Watanabe, Masazumi: *See—*
Sugihara, Hirosada; Motohashi, Michio; Watanabe, Masazumi; Nishikawa, Masao; and Sanno, Yasushi, 4,041,079, Cl. 260-574.000.

Watanabe, Takeo: *See—*
Ohtsuka, Takaaki; Satake, Keigo; Yamazaki, Shiro; Hatakeyama, Nobuo; and Watanabe, Takeo, 4,041,170, Cl. 424-277.000.

Waters, Henry Cook, III: *See—*
Kim, Young Ran; Ornstein, Leonard; and Waters, Henry Cook, III, 4,040,785, Cl. 23-230.00B.

Waters, William D., to Youngstown Sheet and Tube Company. Epoxy composition and article of manufacture thereof. 4,041,007, Cl. 260-37.0EP.

Watkins-Johnson Co.: *See—*
Rose, Ralph E., 4,040,169, Cl. 29-577.000.

Watson, Douglas John: *See—*
Cambridge, Ronan Malcolm; and Watson, Douglas John, 4,041,255, Cl. 179-175.30R.

Watson, James M., to Cosden Technology, Inc. Polymerization inhibitor for vinyl aromatic compounds. 4,040,912, Cl. 203-9.000.

Watson, Wayne T., to Therm-O-Disc, Incorporated. Vented thermostat. 4,041,433, Cl. 337-112.000.

Watt, Richard Edwin, to Cubic Corporation. Measurement system calibrated to be insensitive to temperature variation induced changes in internal phase shifts present in the system. 4,041,490, Cl. 343-17.700.

Watts, Gary P., to Sperry Electronics Ltd. Television remote control system. 4,041,400, Cl. 325-392.000.

Watts, Horace, to H. & D. E. Watts. Mixer taps or valves. 4,040,446, Cl. 137-625.170.

Watts, Lewis W., Jr.: *See—*
Marquis, Edward T.; and Watts, Lewis W., Jr., 4,041,078, Cl. 260-570.00D.

Weatherchem Corporation: *See—*
Tecco, Charles, 4,040,595, Cl. 249-68.000.

Webb, George, to Avco Corporation. Hydraulic delayed arming fuze. 4,040,358, Cl. 102-79.000.

Webb, Oswald: *See—*
Rolt, Anthony P. R.; Walker, Frederick J.; and Webb, Oswald, 4,040,271, Cl. 64-26.000.

Weber Marking Systems, Inc.: *See—*
Faust, Hans B., 4,040,351, Cl. 101-382.0MV.

Webster, Donald R., to Neotec Corporation. Optical analyzer for agricultural products. 4,040,747, Cl. 356-188.000.

Wechsler, Reuben, to Motorola, Inc. Microwave oven power control circuit. 4,041,267, Cl. 219-10.55B.

Weenink, Leon Pieter: *See—*
De Bresser, Gijsbert Frederik Maria; Kassenaar, Teunis Adrianus; Veraa, Ludovicus-Gerardus Johannes Godefrida; and Weenink, Leon Pieter, 4,040,706, Cl. 339-103.00R.

Wehrli, Alfons: *See—*
Gertsch, Peter; and Wehrli, Alfons, 4,040,348, Cl. 101-350.000.

Wei, Lun-Shin: *See—*
Nelson, Alvin I.; Steinberg, Marvin P.; and Wei, Lun-Shin, 4,041,187, Cl. 426-598.000.

Weidenfeller, Gordon J.: *See—*
Pierson, Fred W., Sr.; Pierson, Fred W., Jr.; and Weidenfeller, Gordon J., 4,040,597, Cl. 249-134.000.

Weik, Kirby B.: *See—*
Hogan, Gerard T.; and Weik, Kirby B., 4,040,661, Cl. 297-284.000.

Weiss, William Robert; Saich, Anthony Michael; and Cooksey, James Judson, to Allied Chemical Corporation. Noise reduction insert for apparatus to prevent melted yarn stopped in a high temperature yarn texturing jet. 4,040,782, Cl. 28-271.000.

Weissman, Eugene Y.: *See—*
Argade, Shyam D.; Bortak, John J.; Collins, Stephen M.; and Weissman, Eugene Y., 4,040,935, Cl. 204-256.000.

Weller, Heber W., Jr., to United States of America, Agriculture. Electrodes for electrostatic fiber collecting and spinning apparatus. 4,040,243, Cl. 57-58.890.

Welsh, Lawrence B.: *See—*
Bauer, Carl F.; Welsh, Lawrence B.; Youtsey, Karl J.; and Szofran, Frank R., 4,040,929, Cl. 204-195.00S.

West Electric Co., Ltd.: *See—*
Iwata, Hiroshi; and Ishikawa, Katsuji, 4,041,512, Cl. 354-234.000.

West, Philip W.: *See—*
Nelms, Leonard H.; Reiszner, Kenneth D.; and West, Philip W., 4,040,805, Cl. 55-158.000.

Westdorp, Wolfgang Alfred: *See—*
Patrick, William John; and Westdorp, Wolfgang Alfred, 4,040,895, Cl. 156-618.000.

Westerman, David J.; McTamaney, Louis S.; and Kauber, David J., to FMC Corporation. Solid state relay circuit. 4,041,331, Cl. 307-252.00Q.

Western Cutlery Co.: *See—*
Johnson, Lawrence P., 4,040,181, Cl. 30-161.000.

Western Electric Co., Inc.: *See—*
Fuchs, Francis Joseph, Jr., 4,040,284, Cl. 72-272.000.

Western Geophysical Co. of America: *See—*
Thigpen, Ben B., 4,041,443, Cl. 340-15.5AF.

Western Plastics Corporation: *See—*
LaBranche, Harvey W., 4,040,651, Cl. 285-113.000.

Westinghouse Electric Corporation: *See—*
Bleiberg, Melvin L.; Diamond, Sidney; Rowcliffe, Arthur F.; and Spitznagel, John A., 4,040,876, Cl. 148-37.000.
Elbling, Irving N.; and Saunders, Howard E., 4,040,993, Cl. 260-18.0EP.
Heverly, James S., 4,040,557, Cl. 228-9.000.
Johnson, Joseph E.; and Ostop, John A., 4,040,877, Cl. 148-187.000.
Lampe, Donald R.; and White, Marvin H., 4,041,298, Cl. 235-193.000.
Lange, Frederick F.; and Terwilliger, Gerald R., 4,041,123, Cl. 264-332.000.
Mole, Cecil J., 4,041,337, Cl. 310-178.000.
Pasculle, Maurice J.; Merrill, Edgar F.; and Heyne, Carl J., 4,041,543, Cl. 361-33.000.
Schlegel, Earl S.; and Page, Derrick J., 4,040,170, Cl. 29-577.000.
Simmonds, Leonard B., 4,040,971, Cl. 252-62.540.
Taylor, John W., Jr.; and McGrew, Carl A., 4,041,491, Cl. 343-100.00R.

Wetzel, Rodney J.: *See—*
Lamb, William C.; and Wetzel, Rodney J., 4,040,524, Cl. 214-2.500.

Wheeler, Lewis Halsay, to Air Preheater Company, Inc., The. Annular lens cleaner. 4,040,473, Cl. 165-5.000.

Whirlpool Corporation: *See—*
Swanson, Donald F., 4,040,267, Cl. 62-180.000.

White, Howard L., to Ciba-Geigy Corporation. Process for the production of 2-aryl-2H-benzotriazoles. 4,041,044, Cl. 260-308.00B.

White, Loren Hawdon: *See*—
Dierberger, James Albert; and White, Loren Hawdon, 4,040,767, Cl. 415-115.000.

White, Marvin H.: *See*—
Lampe, Donald R.; and White, Marvin H., 4,041,298, Cl. 235-193.000.

White, Paul L.: *See*—
Kormanyos, Kenneth R.; McCollister, Howard L.; and White, Paul L., 4,041,215, Cl. 429-104.000.

Whitehouse, David R.; and Hartshorn, David W., to Raytheon Company. Flash lamp power supply with direct energization from an AC power supply source. 4,041,351, Cl. 315-205.000.

Whittingham, M. Stanley, to Exxon Research and Engineering Company. Preparation of intercalated chalcogenides. 4,040,917, Cl. 204-92.000.

Wiacek, Marian, to Unican Electrochemical Products Ltd. Production of zinc-air button cell. 4,041,211, Cl. 429-36.000.

Wicker, Alain: *See*—
Desplanches, Gerard; Lazennec, Yvon; and Wicker. Alain, 4,041,216, Cl. 429-104.000.

Wiedemann, Wolfgang; and Platte, Friedrich, to Wasag Chemie GmbH. Preparation of uniform black powder granules. 4,040,570, Cl. 241-3.000.

Wigger, Ralph O.: *See*—
Eggers, Frank W., III; Wigger, Ralph O.; and Coan, Richard L., 4,040,865, Cl. 134-7.000.

Wiggins, Edwin W.; and Carpenter, James F., to McDonnell Douglas Corporation. Polyurethane foam reconstitution. 4,040,991, Cl. 260-2.5BD.

Wightman, R. Mark: *See*—
Bursey, Maurice M.; Hinton, Deborah M.; Sammons, Martin C.; and Wightman, R. Mark, 4,041,346, Cl. 313-336.000.

Wilder, Thomas C.: *See*—
Marshall, David W.; MCGrath, Kenneth W.; O'Day, William R., Jr.; and Wilder, Thomas C., 4,040,942, Cl. 204-13.000.

Wiley, Kenneth, to Raymond Lee Organization, Inc., The, a part interest. Picture hanging device. 4,040,593, Cl. 248-489.000.

Wilhelm Dahle Buro- und Zeichengeratefabrik: *See*—
Dahle, Gerald, 4,040,556, Cl. 227-120.000.

Wilke, Raud A., to Koehring. Control valve with flow control means. 4,040,438, Cl. 137-106.000.

Wilkins, David G.: *See*—
Campbell, George W., Jr.; Wilkins, David G.; and Muench, Jerome T., 4,041,132, Cl. 423-279.000.

Wilkis, Anthony J.: *See*—
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Will, Fritz G.; and Holub, Fred F., to General Electric Company. Zinc plating bath and method of forming a non-dendritic zinc layer. 4,040,916, Cl. 204-55.00R.

Will Ross, Inc.: *See*—
Hunt, James R., 4,040,424, Cl. 128-290.00R.

Wille, Richard M. Fishing tackle storage case. 4,040,202, Cl. 43-57.50A.

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Williams, John Lloyd: *See*—
Wisdom, Graham John; Creteau, Peter Verne; and Williams, John Lloyd, 4,041,460, Cl. 364-900.000.

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Williams Tool, Inc.: *See*—
Williams, Raymond H.; and Misiaszek, Emil J., 4,041,502, Cl. 346-33.00A.

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Willmann, Erich: *See*—
Michel, Wilfried; Reichert, Hartmut; and Willmann, Erich, 4,041,503, Cl. 346-83.000.

Willson, Michael C.: *See*—
David, Donald J.; and Willson, Michael C., 4,040,691, Cl. 312-31.000.

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Karjala, Sulo A., 4,041,150, Cl. 424-71.000.

Wilson, Homer M., to Petrolite Corporation. Corrosion ratemeter. 4,040,931, Cl. 204-195.00C.

Wilson, John J.; and Rhoades, Donald M., to Logansport Machine Co., Inc. Fluid supply distributor. 4,040,338, Cl. 92-106.000.

Wilson, Richard John Hugh, to Brewing Patents Limited. Introducing gases into fermentation liquids. 4,041,180, Cl. 426-11.000.

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Wilton Corporation: *See*—
Kartasuk, Raymond H.; Smierciak, Walter R.; and Hlinka, Edward A., 4,040,613, Cl. 269-247.000.

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Sharpe, Andrew Jackson, Jr.; Windhager, Robert H.; and Hearp, Kathleen Seese, 4,040,984, Cl. 252-500.000.

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Winkle, Roy Victor: *See*—
Hight, Michael John; Winkle, Roy Victor; and Dale, John Robert, 4,040,885, Cl. 156-378.000.

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Wirth, Walter: *See*—
Hergeth, Herbert; and Wirth, Walter, 4,040,948, Cl. 209-22.000.

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Wise, John J.: *See*—
Kuo, James C.; Prater, Charles Dwight; and Wise, John J., 4,041,094, Cl. 260-676.00R.

Wise, Larry Edward: *See*—
Davis, Michael Ian; Mayes, Gary Wayne; McDermott, Thomas Stephen; and Wise, Larry Edward, 4,041,462, Cl. 364-200.000.

Withycombe, Donald Arthur: *See*—
Shuster, Edward J.; Withycombe, Donald Arthur; Mookherjee, Braja Dulal; and Mussinan, Cynthia J., 4,040,987, Cl. 252-522.000.

Witte, Roy: *See*—
McKee, William H.; and Witte, Roy, 4,040,702, Cl. 339-97.00R.

Witte, Wolfgang W. Method and device for generating a signal dependent on the distance of an object in an object space. 4,040,739, Cl. 356-4.000.

Wittersheim, Adam, to Goldwell GmbH Chemische Fabrik H.E. Dotter. Foam generator for foaming liquids. 4,040,975, Cl. 252-359.00E.

Wittosch, William A., Jr.: *See*—
Quick, James R.; and Wittosch, William A., Jr., 4,041,122, Cl. 264-277.000.

Wivinis, Gerald P. Pulling tool and method. 4,040,287, Cl. 72-479.000.

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Wood, Frederick C.: *See*—
Kelley, Arnold E.; Reeg, Cloyd P.; Wood, Frederick C.; and Cheadle, George D., 4,040,944, Cl. 208-89.000.

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Mazzarella, Emil D.; Wood, Leonard J., Jr.; and Maliczyszyn, Walter, 4,040,900, Cl. 162-158.000.

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Schlanert, George A.; Wood, Lorin A.; and Rayburn, Gerald A., 4,040,581, Cl. 244-83.00K.

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Dalichow, Rolf W.; and Woodhull, Frederic W., 4,041,387, Cl. 324-78.00R.

Woodier, George H., to Curtiss-Wright Corporation. Rotary engine modified for low emissions. 4,040,392, Cl. 123-8.450.

Woodward Governor Company: *See*—
Parker, George E.; and Garvey, Daniel C., 4,041,429, Cl. 335-276.000.

Worne, Howard E.: *See*—
Erickson, Lennart G.; and Worne, Howard E., 4,041,182, Cl. 426-59.000.

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Donahue, James T.; Hall, Kenneth M.; and Werth, Arthur J., 4,041,358, Cl. 361-365.000.

Worthington Biochemical Corporation: *See*—
Trivedi, Ramesh C.; Bungay, Henry R., III; and Cuccolo, Paul J., 4,040,786, Cl. 23-230.00R.

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Wurdeman, James E.: *See*—
Wurdeman, Marion E.; Wurdeman, James E.; and Kopaska, Arnold F., 4,040,529, Cl. 214-17.0CB.

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Clarkson, Stanley G.; and Muscarella, Joseph N., deceased, 4,040,616, Cl. 271-65.000.

Cota, Dan E.; Charter, Ted R.; Beeson, Robert M.; and Kinkead, Robin D., 4,041,467, Cl. 364-900.000.
Evans, Paul F., 4,040,828, Cl. 96-1.200.
Goffe, William L.; Mammino, Joseph; and Ewing, Joan R., 4,040,826.
Hamaker, Ralph A.; and Carr, George Phillip, 4,040,827, Cl. 96-1.0LY.
Jones, Lewis O., 4,040,969, Cl. 252-62.10R.
Rote, Everett A.; and Smith, Edward G., 4,040,678, Cl. 308-6.00R.
Shanly, Alan L., 4,040,157, Cl. 29-123.000.
Smith, Richard E., 4,040,386, Cl. 118-653.000.

Xygiene, Inc.: *See—*
Suroff, Leonard W., 4,040,414, Cl. 128-24.00A.

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Obara, Isao; and Yagami, Kazuo, 4,041,144, Cl. 423-618.000.

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Yamada, Minoru: *See—*
Arai, Atsuaki; Shiba, Keisuke; Yamada, Minoru; Furutachi, Nobuo; and Nakamura, Kotaro, 4,040,835, Cl. 96-56.500.
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Iijima, Ryozo; Matsubara, Yukio; Yamaguchi, Ginichi; and Fukushima, Masatoshi, 4,040,937, Cl. 204-281.000.

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Matsuura, Mikio; Nishi, Nobuji; Yamaguchi, Masatsugu; Matsuoka, Michio; and Masuyama, Takeshi, 4,041,437, Cl. 338-35.000.

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Yamamoto, Minoru: *See—*
Hayashi, Kiyoshige; Nakaniwa, Mikio; Kobayashi, Nobuyuki; Yamamoto, Minoru; and Hase, Yoshihiko, 4,040,946, Cl. 208-131.000.

Yamanouchi Pharmaceutical Co., Ltd.: *See—*
Murakami, Masuo; Takahashi, Kozo; Hirata, Yasuhumi; Takashima, Mutsuo; Takeda, Masaaki; Ino, Hiroyoshi; and Iwanami, Sumio, 4,041,032, Cl. 260-250.0BN.

Yamashita, Katusuke: *See—*
Ohsako, Kyoichi; and Yamashita, Katusuke, 4,041,280, Cl. 235-92.0CN.

Yamazaki, Osamu; Miki, Sukeichi; and Takezaki, Tsuneo, to Matsushita Electric Industrial Co., Ltd. Composite stereophonic signal generator. 4,041,244, Cl. 179-15.0BT.

Yamazaki, Shiro: *See—*
Ohtsuka, Takaaki; Satake, Keigo; Yamazaki, Shiro; Hatakeyama, Nobuo; and Watanabe, Takeo, 4,041,170, Cl. 424-277.000.

Yancey, LeRoy D. Cross connect panel for lighting sys' ms. 4,041,257, Cl. 200-1.00R.

Yardney Electric Corporation: *See—*
Berchielli, Aldo S.; and Chireau, Roland F., 4,041,221, Cl. 429-206.000.

Yarita, Kenichi: *See—*
Uchio, Ryosuke; Kikuchi, Kenji; Asai, Soichiro; and Yarita, Kenichi, 4,040,906, Cl. 195-36.00R.

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Yasuma, Yoichi: *See—*
Noji, Tasuku; and Yasuma, Yoichi, 4,041,422, Cl. 334-49.000.

Yen, Edward Chen-Hsiung; and Jenssen, Thomas Arthur, to Eastman Kodak Company. Apparatus for treating a workpiece. 4,040,886, Cl. 156-350.000.

Yerman, Alexander J., to General Electric Company. Semiconductor element having a polymeric protective coating and glass coating overlay. 4,040,874, Cl. 148-33.300.

Yevick, George Johannus, to Personal Communications, Inc. Indent duplicating process. 4,041,114, Cl. 264-1.000.

Yokokawa, Sumio: *See—*
Miyoshi, Tadayoshi; Nakagaki, Shintaro; Takanashi, Itsuo; Yokokawa, Sumio; Miyazaki, Kenichi; Tumiyama, Hisanori; and Motoyama, Koithiro, 4,041,528, Cl. 358-47.000.

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Fukuroi, Takeo, 4,040,150, Cl. 24-205.13R.

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Uchida, Isamu; Kokubo, Eiichi; and Yoshida, Minoru, 4,041,282, Cl. 235-98.00R.

Yoshihara, Keisuke: *See—*
Oshima, Akira; Yoshihara, Keisuke; Shiki, Mikio; and Ikeda, Tuneo, 4,041,120, Cl. 264-171.000.

Yoshikawa, Tsugio: *See—*
Sekido, Kenzi; and Yoshikawa, Tsugio, 4,040,766, Cl. 415-9.000.

Yoshitake, Katsumi: *See—*
Aboshi, Michihiro; Kakutani, Tsutomu; Yoshitake, Katsumi; and Koseki, Toshinori, 4,041,002, Cl. 260-30.60R.

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Young, Donald C., to Union Oil Company of California. Ammonium polyphosphate production. 4,041,133, Cl. 423-305.000.

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Youngstown Sheet and Tube Company: *See—*
Waters, William D., 4,041,007, Cl. 260-37.0EP.

Youtsey, Karl J.: *See—*
Bauer, Carl F.; Welsh, Lawrence B.; Youtsey, Karl J.; and Szofran, Frank R., 4,040,929, Cl. 204-195.00S.

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Steddom, Clark M.; and Yungblut, Charles W., 4,041,439, Cl. 338-78.000.

Zachry, Woodie: *See—*
Grover, Vijay K.; and Zachry, Woodie, 4,040,714, Cl. 339-264.00R.

Zahn, Carl W.; and Clayton, Hadwen A., to Phillips Petroleum Company. Recovery of natural gas liquids by partial condensation. 4,040,259, Cl. 62-37.000.

Zajacek, John G.: *See—*
Zehner, Lee R.; and Zajacek, John G., 4,041,067, Cl. 260-485.00R.
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Zaki, Moustafa A., to Spence Engineering Company. Silenced valve construction. 4,040,440, Cl. 137-375.000.

Zanca, Francois: *See—*
Dhugues, Paul; and Zanca, Francois, 4,040,253, Cl. 60-303.000.

Zarkadas, Konstantin. Circuit for monitoring the operativeness of current-consuming electrical devices. 4,041,451, Cl. 340-79.000.

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Zechnall, Richard: *See—*
Wahl, Josef; Schmidt, Peter Jurgen; and Zechnall, Richard, 4,040,394, Cl. 123-32.0EA.

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Zhuravlev, Vitaly Ivanovich: *See—*
Makeev, Boris Anatolievich; Stepochkin, Lev Mikhailovich; Korot, Garri Moiseevich; Batozsky, Vadim Ivanovich; Khodorov, Alexandr Iosifovich; Zhuravlev, Vitaly Ivanovich; and Eremenko, Adolf Grigorievich, 4,040,318, Cl. 83-71.000.

Ziegler, B. Randall, to GAF Corporation. Cotton-cement articles. 4,040,851, Cl. 106-93.000.

Zimmerman, G. A.: *See—*
Rothenstein, Julius; and Zimmerman, G. A., 4,040,880, Cl. 149-76.000.

Zimmerman, John E.; and Reis, Richard M., Sr., to Northern Conveyor & Manufacturing Corporation. Method of and apparatus for removing brine from hides. 4,040,278, Cl. 69-42.000.

Zinnes, Harold: *See—*
Fabian, Arthur C.; Genzer, Jerome D.; Kasulanis, Charles Francis; Shavel, John, Jr.; and Zinnes, Harold, 4,041,042, Cl. 260-301.000.

Zipper, Jaime A., to G. D. Searle & Co. Intrauterine device. 4,040,417, Cl. 128-130.000.

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DOCUM NUMI
B 48
B 54
B 59
B 66
B 71
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B 78
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CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 48,560	4,002,772	Mar. 30, 1976	Jan. 11, 1977
B 54,859	4,000,101	Feb. 17, 1976	Dec. 28, 1976
B 59,512	3,999,216	Mar. 16, 1976	Dec. 21, 1976
B 66,272	4,014,978	Feb. 24, 1976	Mar. 29, 1977
B 71,613	4,008,393	Mar. 16, 1976	Feb. 15, 1977
B 73,017	4,001,879	Mar. 9, 1976	Jan. 4, 1977
B 78,315	3,982,192	Feb. 10, 1976	Sep. 21, 1976
B 79,099	3,982,177	Jan. 13, 1976	Sep. 21, 1976
B 97,259	3,999,614	Mar. 9, 1976	Dec. 28, 1976
B 105,006	4,007,074	Mar. 23, 1976	Feb. 8, 1977
B 111,130	4,001,380	Mar. 16, 1976	Jan. 4, 1977
B 141,968	4,013,442	Mar. 30, 1976	Mar. 22, 1977
B 150,142	3,981,767	Jan. 27, 1976	Sep. 21, 1976
B 159,570	4,036,870	Mar. 23, 1976	July 19, 1977
B 160,045	3,983,446	Jan. 13, 1976	Sep. 28, 1976
B 160,099	3,987,221	Jan. 13, 1976	Oct. 19, 1976
B 163,463	3,981,659	Jan. 27, 1976	Sep. 21, 1976
B 167,470	4,001,101	Mar. 2, 1976	Jan. 4, 1977
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B 200,759	3,986,872	Feb. 3, 1976	Oct. 19, 1976
B 208,916	3,987,106	Jan. 13, 1976	Oct. 19, 1976
B 214,925	3,997,648	Mar. 9, 1976	Dec. 14, 1976
B 231,416	4,000,054	Mar. 30, 1976	Dec. 28, 1976
B 236,266	4,013,624	Mar. 23, 1976	Mar. 22, 1977
B 236,342	4,001,182	Feb. 10, 1976	Jan. 4, 1977
B 248,240	3,983,556	Jan. 13, 1976	Sep. 28, 1976
B 257,143	4,000,111	Mar. 16, 1976	Dec. 28, 1976
B 270,274	3,982,223	Feb. 17, 1976	Sep. 21, 1976
B 270,351	3,997,893	Mar. 30, 1976	Dec. 14, 1976
B 271,743	4,001,195	Mar. 16, 1976	Jan. 4, 1977
B 276,026	3,992,405	Feb. 3, 1976	Nov. 16, 1976
B 279,415	4,000,697	Mar. 16, 1976	Jan. 4, 1977
B 279,969	3,986,073	Jan. 13, 1976	Oct. 12, 1976
B 281,162	4,009,481	Mar. 23, 1976	Feb. 22, 1977
B 283,941	3,995,313	Feb. 3, 1976	Nov. 30, 1976
B 288,757	4,001,072	Mar. 30, 1976	Jan. 4, 1977
B 301,143	3,991,107	Jan. 27, 1976	Nov. 9, 1976
B 302,160	3,985,774	Feb. 3, 1976	Oct. 12, 1976
B 306,668	3,985,713	Feb. 3, 1976	Oct. 12, 1976
B 307,698	3,993,763	Feb. 3, 1976	Nov. 23, 1976
B 308,659	3,981,947	Jan. 27, 1976	Sep. 21, 1976
B 311,450	3,988,976	Mar. 9, 1976	Nov. 2, 1976
B 311,779	4,013,481	Feb. 10, 1976	Mar. 22, 1977
B 313,280	4,003,591	Apr. 6, 1976	Jan. 18, 1977
B 326,211	3,988,272	Mar. 23, 1976	Oct. 26, 1976
B 328,065	4,014,752	Mar. 30, 1976	Mar. 29, 1977
B 328,077	4,014,860	Apr. 13, 1976	Mar. 29, 1977
B 328,116	4,000,774	Mar. 9, 1976	Jan. 4, 1977
B 330,719	4,001,121	Mar. 16, 1976	Jan. 4, 1977
B 330,736	3,996,299	Feb. 3, 1976	Dec. 7, 1976
B 332,442	4,001,231	Mar. 30, 1976	Jan. 4, 1977
B 333,110	3,989,867	Mar. 16, 1976	Nov. 2, 1976
B 333,247	4,001,201	Mar. 16, 1976	Jan. 4, 1977
B 333,838	4,006,263	Mar. 23, 1976	Feb. 1, 1977
B 335,783	4,013,744	Mar. 30, 1976	Mar. 22, 1977
B 336,754	3,989,805	Mar. 16, 1976	Nov. 2, 1976
B 337,023	4,013,188	Mar. 30, 1976	Mar. 22, 1977
B 337,823	4,002,746	Mar. 23, 1976	Jan. 11, 1977
B 339,194	3,982,215	Feb. 3, 1976	Sep. 21, 1976
B 339,446	4,001,067	Feb. 24, 1976	Jan. 4, 1977
B 340,170	4,000,444	Mar. 30, 1976	Dec. 28, 1976
B 344,669	4,013,655	Mar. 16, 1976	Mar. 22, 1977
B 347,661	3,999,218	Mar. 16, 1976	Dec. 21, 1976
B 348,433	3,984,405	Feb. 3, 1976	Oct. 5, 1976
B 349,370	3,989,684	Jan. 27, 1976	Nov. 2, 1976
B 351,455	4,001,309	Feb. 24, 1976	Jan. 4, 1977
B 354,222	4,012,305	Mar. 23, 1976	Mar. 15, 1977
B 354,959	3,995,996	Feb. 17, 1976	Dec. 7, 1976
B 356,187	3,981,222	Jan. 20, 1976	Sep. 21, 1976
B 356,470	4,014,789	Mar. 23, 1976	Mar. 29, 1977
B 357,526	4,001,319	Mar. 23, 1976	Jan. 4, 1977
B 358,260	3,989,661	Mar. 30, 1976	Nov. 2, 1976
B 358,427	3,989,896	Feb. 3, 1976	Nov. 2, 1976
B 359,768	4,013,684	Mar. 30, 1976	Mar. 22, 1977
B 359,901	3,981,729	Jan. 13, 1976	Sep. 21, 1976
B 361,954	4,014,753	Apr. 6, 1976	Mar. 29, 1977
B 363,565	4,004,821	Mar. 30, 1976	Jan. 25, 1977
B 364,797	3,996,131	Feb. 17, 1976	Dec. 7, 1976
B 367,092	4,014,920	Apr. 13, 1976	Mar. 29, 1977
B 367,305	3,998,640	Mar. 2, 1976	Dec. 21, 1976
B 367,621	3,989,589	Feb. 3, 1976	Nov. 2, 1976
B 369,221	3,985,834	Feb. 24, 1976	Oct. 12, 1976
B 369,373	4,013,683	Mar. 23, 1976	Mar. 22, 1977
B 369,379	4,013,754	Mar. 30, 1976	Mar. 22, 1977
B 370,309	3,989,640	Jan. 20, 1976	Nov. 2, 1976
B 371,095	4,005,074	Mar. 23, 1976	Jan. 25, 1977
B 371,635	4,010,290	Mar. 23, 1976	Mar. 1, 1977
B 371,912	3,995,738	Mar. 2, 1976	Dec. 7, 1976
B 372,016	3,989,685	Mar. 9, 1976	Nov. 2, 1976
B 372,232	4,000,967	Mar. 16, 1976	Jan. 4, 1977
B 372,722	3,998,925	Mar. 9, 1976	Dec. 21, 1976
B 373,354	3,989,870	Jan. 27, 1976	Nov. 2, 1976
B 374,553	4,008,394	Mar. 30, 1976	Feb. 15, 1977
B 374,588	3,985,899	Jan. 27, 1976	Oct. 12, 1976
B 376,749	4,014,856	Mar. 30, 1976	Mar. 29, 1977
B 378,513	3,981,750	Jan. 27, 1976	Sep. 21, 1976
B 378,760	4,001,477	Mar. 9, 1976	Jan. 4, 1977
B 379,177	3,981,976	Jan. 27, 1976	Sep. 21, 1976
B 380,137	4,014,802	Mar. 23, 1976	Mar. 29, 1977
B 381,006	4,009,447	Apr. 6, 1976	Feb. 22, 1977
B 381,709	3,984,587	Jan. 13, 1976	Oct. 5, 1976
B 381,985	3,990,775	Feb. 3, 1976	Nov. 9, 1976
B 382,120	4,013,639	Mar. 23, 1976	Mar. 22, 1977
B 383,697	4,008,211	Feb. 17, 1976	Feb. 15, 1977
B 384,225	3,998,523	Mar. 16, 1976	Dec. 21, 1976
B 384,330	3,985,613	Jan. 27, 1976	Oct. 12, 1976
B 384,654	3,992,681	Feb. 24, 1976	Nov. 16, 1976
B 385,024	3,994,911	Feb. 10, 1976	Nov. 30, 1976
B 385,483	3,993,684	Feb. 17, 1976	Nov. 23, 1976
B 385,631	3,982,924	Jan. 27, 1976	Sep. 28, 1976
B 386,257	3,981,915	Feb. 3, 1976	Sep. 21, 1976
B 386,673	3,993,717	Feb. 3, 1976	Nov. 23, 1976
B 386,828	3,992,440	Feb. 3, 1976	Nov. 16, 1976
B 387,337	D 243,157	Mar. 16, 1976	Jan. 25, 1977
B 388,675	4,012,459	Mar. 30, 1976	Mar. 15, 1977
B 389,155	4,000,970	Mar. 30, 1976	Jan. 4, 1977
B 389,304	3,986,829	Jan. 27, 1976	Oct. 19, 1976
B 390,031	3,985,799	Jan. 13, 1976	Oct. 12, 1976
B 390,408	3,992,426	Feb. 3, 1976	Nov. 16, 1976
B 390,979	4,003,850	Mar. 23, 1976	Jan. 18, 1977
B 391,473	3,988,370	Mar. 2, 1976	Oct. 26, 1976
B 391,797	3,988,046	Mar. 9, 1976	Oct. 26, 1976
B 391,828	4,014,933	Apr. 6, 1976	Mar. 29, 1977
B 391,844	3,999,165	Mar. 16, 1976	Dec. 21, 1976
B 392,798	3,996,249	Mar. 30, 1976	Dec. 7, 1976
B 394,248	3,989,764	Jan. 27, 1976	Nov. 2, 1976
B 394,350	3,982,200	Jan. 13, 1976	Sep. 21, 1976
B 394,742	4,009,285	Apr. 13, 1976	Feb. 22, 1977
B 395,554	3,998,156	Mar. 9, 1976	Dec. 21, 1976
B 395,97[illegible]	4,001,085	Mar. 2, 1976	Jan. 4, 1977
B 396,16[illegible]	3,989,590	Feb. 3, 1976	Nov. 2, 1976
B 396,37[illegible]	D 243,148	Apr. 6, 1976	Jan. 25, 1977
B 397,67[illegible]	3,998,438	Mar. 16, 1976	Dec. 21, 1976
B 398,084	3,996,239	Feb. 3, 1976	Dec. 7, 1976
B 398,220	3,990,834	Feb. 3, 1976	Nov. 9, 1976
B 398,488	3,987,991	Feb. 24, 1976	Oct. 26, 1976
B 399,098	3,997,665	Feb. 24, 1976	Dec. 14, 1976
B 399,632	4,001,046	Mar. 9, 1976	Jan. 4, 1977
B 399,908	3,983,323	Jan. 13, 1976	Sep. 28, 1976
B 400,871	3,988,893	Feb. 17, 1976	Nov. 2, 1976
B 401,042	D 242,197	Mar. 16, 1976	Nov. 9, 1976
B 401,221	4,014,791	Apr. 6, 1976	Mar. 29, 1977
B 402,162	3,994,902	Mar. 2, 1976	Nov. 30, 1976
B 402,328	3,995,545	Apr. 6, 1976	Dec. 7, 1976
B 402,553	3,983,219	Feb. 17, 1976	Sep. 28, 1976
B 402,657	4,013,665	Apr. 6, 1976	Mar. 22, 1977
B 402,929	3,991,251	Feb. 3, 1976	Nov. 9, 1976
B 403,076	4,014,917	Apr. 20, 1976	Mar. 29, 1977
B 403,243	3,996,232	Mar. 30, 1976	Dec. 7, 1976
B 403,326	4,001,212	Mar. 23, 1976	Jan. 4, 1977
B 403,477	3,995,315	Feb. 3, 1976	Nov. 30, 1976
B 403,507	3,982,095	Feb. 10, 1976	Sep. 21, 1976
B 403,766	3,994,834	Feb. 10, 1976	Nov. 30, 1976
B 403,883	4,001,481	Mar. 23, 1976	Jan. 4, 1977
B 405,726	3,981,241	Jan. 13, 1976	Sep. 21, 1976
B 406,546	D 242,966	Mar. 16, 1976	Jan. 11, 1977
B 407,205	4,000,966	Mar. 16, 1976	Jan. 4, 1977
B 407,737	3,992,546	Feb. 3, 1976	Nov. 16, 1976
B 407,812	4,010,006	Mar. 23, 1976	Mar. 1, 1977
B 408,123	4,014,887	Apr. 13, 1976	Mar. 29, 1977
B 409,848	3,983,270	Jan. 27, 1976	Sep. 28, 1976
B 410,074	4,001,303	Feb. 24, 1976	Jan. 4, 1977
B 410,694	3,995,530	Mar. 23, 1976	Dec. 7, 1976
B 411,471	3,982,933	Feb. 17, 1976	Sep. 28, 1976
B 411,624	4,001,205	Mar. 16, 1976	Jan. 4, 1977
B 411,765	3,993,428	Feb. 24, 1976	Nov. 23, 1976
B 412,068	3,981,244	Jan. 13, 1976	Sep. 21, 1976
B 412,124	4,007,000	Mar. 23, 1976	Feb. 8, 1977
B 413,379	4,001,325	Mar. 9, 1976	Jan. 4, 1977
B 414,028	3,993,738	Feb. 17, 1976	Nov. 23, 1976
B 414,266	3,993,614	Feb. 10, 1976	Nov. 23, 1976
B 414,481	3,982,979	Jan. 20, 1976	Sep. 28, 1976
B 414,971	D 242,208	Feb. 10, 1976	Nov. 9, 1976
B 415,021	3,994,173	Mar. 2, 1976	Nov. 30, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 415,122	3,997,503	Feb. 10, 1976	Dec. 14, 1976
B 415,590	4,009,317	Mar. 23, 1976	Feb. 22, 1977
B 416,257	4,001,335	Mar. 16, 1976	Jan. 4, 1977
B 416,589	3,990,363	Jan. 27, 1976	Nov. 9, 1976
B 417,014	3,981,851	Jan. 13, 1976	Sep. 21, 1976
B 417,164	4,001,360	Mar. 2, 1976	Jan. 4, 1977
B 417,349	3,985,076	Mar. 9, 1976	Oct. 12, 1976
B 417,498	4,013,471	Mar. 23, 1976	Mar. 22, 1977
B 418,489	3,989,592	Jan. 13, 1976	Nov. 2, 1976
B 419,173	3,999,728	Mar. 9, 1976	Dec. 28, 1976
B 419,582	3,989,681	Mar. 2, 1976	Nov. 2, 1976
B 420,176	4,001,017	Mar. 16, 1976	Jan. 4, 1977
B 420,321	3,990,645	Mar. 30, 1976	Nov. 9, 1976
B 420,472	3,993,934	Feb. 24, 1976	Nov. 23, 1976
B 421,373	4,001,326	Mar. 23, 1976	Jan. 4, 1977
B 421,608	4,013,806	Mar. 23, 1976	Mar. 22, 1977
B 421,975	3,994,693	Mar. 2, 1976	Nov. 30, 1976
B 422,063	3,994,835	Feb. 3, 1976	Nov. 30, 1976
B 422,156	4,010,401	Mar. 23, 1976	Mar. 1, 1977
B 423,365	3,996,186	Feb. 17, 1976	Dec. 7, 1976
B 423,404	3,990,958	Mar. 2, 1976	Nov. 9, 1976
B 423,441	3,997,137	Feb. 17, 1976	Dec. 14, 1976
B 423,867	3,990,844	Feb. 3, 1976	Nov. 9, 1976
B 423,883	3,986,871	Jan. 27, 1976	Oct. 19, 1976
B 424,354	D 242,416	Feb. 10, 1976	Nov. 23, 1976
B 424,410	4,021,196	Mar. 30, 1976	May 3, 1977
B 424,989	3,990,569	Feb. 3, 1976	Nov. 9, 1976
B 425,193	4,002,107	Mar. 23, 1976	Jan. 11, 1977
B 425,285	4,014,676	Apr. 13, 1976	Mar. 29, 1977
B 425,462	3,998,396	Mar. 9, 1976	Dec. 21, 1976
B 425,588	3,985,111	Jan. 13, 1976	Oct. 12, 1976
B 426,157	4,013,714	Mar. 23, 1976	Mar. 22, 1977
B 426,227	3,999,028	Mar. 2, 1976	Dec. 21, 1976
B 426,266	3,998,839	Mar. 2, 1976	Dec. 21, 1976
B 426,274	4,014,949	Jan. 20, 1976	Mar. 29, 1977
B 426,424	3,993,742	Feb. 3, 1976	Nov. 23, 1976
B 426,639	3,992,539	Feb. 3, 1976	Nov. 16, 1976
B 426,819	3,995,868	Feb. 17, 1976	Dec. 7, 1976
B 427,883	3,982,277	Jan. 20, 1976	Sep. 21, 1976
B 427,946	4,006,161	Mar. 23, 1976	Feb. 1, 1977
B 428,103	4,000,211	Feb. 10, 1976	Dec. 28, 1976
B 428,271	3,987,415	Mar. 23, 1976	Oct. 19, 1976
B 428,408	3,995,252	Mar. 2, 1976	Nov. 30, 1976
B 428,877	3,984,649	Jan. 27, 1976	Oct. 5, 1976
B 429,018	3,990,061	Feb. 10, 1976	Nov. 2, 1976
B 429,027	4,001,260	Mar. 23, 1976	Jan. 4, 1977
B 429,157	3,990,628	Jan. 27, 1976	Nov. 9, 1976
B 429,434	3,989,223	Feb. 17, 1976	Nov. 2, 1976
B 430,157	3,992,465	Feb. 17, 1976	Nov. 16, 1976
B 430,172	3,982,563	Jan. 13, 1976	Sep. 28, 1976
B 430,213	4,013,514	Mar. 30, 1976	Mar. 22, 1977
B 430,276	3,982,171	Jan. 20, 1976	Sep. 21, 1976
B 430,287	D 242,489	Feb. 10, 1976	Nov. 23, 1976
B 430,326	4,003,581	Mar. 23, 1976	Jan. 18, 1977
B 430,334	3,981,677	Jan. 27, 1976	Sep. 21, 1976
B 431,072	3,985,610	Jan. 20, 1976	Oct. 12, 1976
B 431,334	3,988,095	Mar. 16, 1976	Oct. 26, 1976
B 431,713	4,000,167	Feb. 10, 1976	Dec. 28, 1976
B 431,785	3,999,950	Feb. 24, 1976	Dec. 28, 1976
B 431,797	4,007,290	Mar. 30, 1976	Feb. 8, 1977
B 432,049	3,995,123	Mar. 23, 1976	Nov. 30, 1976
B 432,140	3,999,163	Mar. 23, 1976	Dec. 21, 1976
B 432,265	4,013,480	Mar. 23, 1976	Mar. 22, 1977
B 432,594	4,003,404	Mar. 30, 1976	Jan. 18, 1977
B 432,969	3,997,017	Mar. 2, 1976	Dec. 14, 1976
B 432,991	3,991,669	Mar. 2, 1976	Nov. 16, 1976
B 433,094	3,987,768	Jan. 27, 1976	Oct. 26, 1976
B 433,707	4,013,594	Mar. 23, 1976	Mar. 22, 1977
B 433,892	4,016,061	Apr. 6, 1976	Apr. 5, 1977
B 433,930	4,012,324	Mar. 23, 1976	Mar. 15, 1977
B 434,206	3,994,610	Feb. 3, 1976	Nov. 30, 1976
B 434,441	D 242,849	Mar. 16, 1976	Dec. 28, 1976
B 435,481	4,000,892	Mar. 9, 1976	Jan. 4, 1977
B 435,570	4,000,908	Mar. 16, 1976	Jan. 4, 1977
B 435,617	4,001,234	Mar. 16, 1976	Jan. 4, 1977
B 436,724	3,991,856	Feb. 24, 1976	Nov. 16, 1976
B 437,209	4,001,193	Feb. 3, 1976	Jan. 4, 1977
B 437,559	3,993,287	Feb. 3, 1976	Nov. 23, 1976
B 437,596	3,985,638	Jan. 27, 1976	Oct. 12, 1976
B 437,894	4,001,015	Mar. 2, 1976	Jan. 4, 1977
B 437,986	4,011,399	Apr. 20, 1976	Mar. 8, 1977
B 438,048	4,001,394	Mar. 23, 1976	Jan. 4, 1977
B 438,484	3,992,451	Feb. 17, 1976	Nov. 16, 1976
B 438,882	3,983,719	Feb. 24, 1976	Oct. 5, 1976
B 438,916	3,983,050	Jan. 13, 1976	Sep. 28, 1976
B 439,542	3,982,199	Jan. 27, 1976	Sep. 21, 1976
B 439,778	4,001,455	Feb. 3, 1976	Jan. 4, 1977
B 440,548	4,001,271	Mar. 16, 1976	Jan. 4, 1977
B 440,632	4,014,955	Apr. 13, 1976	Mar. 29, 1977
B 440,633	4,000,116	Feb. 10, 1976	Dec. 28, 1976
B 440,858	3,993,670	Feb. 3, 1976	Nov. 23, 1976
B 441,543	4,014,755	Mar. 23, 1976	Mar. 29, 1977
B 441,605	4,026,862	Feb. 3, 1976	May 31, 1977
B 441,723	3,988,249	Mar. 16, 1976	Oct. 26, 1976
B 441,789	4,001,449	Mar. 30, 1976	Jan. 4, 1977
B 442,163	D 242,192	Mar. 16, 1976	Nov. 9, 1976
B 442,295	4,000,477	Mar. 16, 1976	Dec. 28, 1976
B 442,431	4,011,260	Mar. 23, 1976	Mar. 8, 1977
B 442,810	3,997,533	Feb. 24, 1976	Dec. 14, 1976
B 442,866	3,982,351	Feb. 24, 1976	Sep. 28, 1976
B 442,953	4,002,657	Mar. 23, 1976	Jan. 11, 1977
B 442,970	3,989,890	Feb. 3, 1976	Nov. 2, 1976
B 443,163	3,981,242	Feb. 3, 1976	Sep. 21, 1976
B 443,446	D 242,494	Apr. 6, 1976	Nov. 23, 1976
B 443,563	3,996,204	Feb. 24, 1976	Dec. 7, 1976
B 443,647	3,990,737	Feb. 17, 1976	Nov. 9, 1976
B 443,712	3,982,233	Jan. 27, 1976	Sep. 21, 1976
B 444,078	4,014,854	Mar. 23, 1976	Mar. 29, 1977
B 444,294	4,013,634	Mar. 30, 1976	Mar. 22, 1977
B 444,437	3,995,171	Mar. 9, 1976	Nov. 30, 1976
B 445,166	4,001,252	Mar. 2, 1976	Jan. 4, 1977
B 445,459	3,988,889	Feb. 3, 1976	Nov. 2, 1976
B 445,493	3,994,903	Mar. 2, 1976	Nov. 30, 1976
B 445,690	3,999,584	Feb. 3, 1976	Dec. 28, 1976
B 446,107	4,001,276	Mar. 9, 1976	Jan. 4, 1977
B 446,956	4,014,765	Apr. 13, 1976	Mar. 29, 1977
B 447,000	3,984,419	Feb. 3, 1976	Oct. 5, 1976
B 447,440	3,991,724	Feb. 17, 1976	Nov. 16, 1976
B 449,892	3,997,919	Mar. 23, 1976	Dec. 14, 1976
B 449,988	4,014,794	Mar. 30, 1976	Mar. 29, 1977
B 450,196	3,997,701	Feb. 10, 1976	Dec. 14, 1976
B 450,413	4,007,463	Mar. 23, 1976	Feb. 8, 1977
B 450,521	3,982,838	Feb. 17, 1976	Sep. 28, 1976
B 450,701	3,991,084	Mar. 16, 1976	Nov. 9, 1976
B 450,708	3,989,724	Mar. 9, 1976	Nov. 2, 1976
B 450,870	3,998,951	Mar. 16, 1976	Dec. 21, 1976
B 450,967	3,983,055	Jan. 13, 1976	Sep. 28, 1976
B 451,248	3,997,758	Mar. 2, 1976	Dec. 14, 1976
B 451,308	3,991,037	Feb. 17, 1976	Nov. 9, 1976
B 451,396	4,000,450	Apr. 13, 1976	Dec. 28, 1976
B 451,438	Re. 29,066	Mar. 2, 1976	Dec. 7, 1976
B 451,534	3,986,033	Jan. 13, 1976	Oct. 12, 1976
B 452,034	4,002,367	Mar. 23, 1976	Jan. 11, 1977
B 452,138	4,004,278	Mar. 23, 1976	Jan. 18, 1977
B 452,293	4,014,726	Mar. 30, 1976	Mar. 29, 1977
B 452,501	4,001,111	Mar. 16, 1976	Jan. 4, 1977
B 452,672	3,981,602	Jan. 13, 1976	Sep. 21, 1976
B 452,879	4,001,089	Mar. 16, 1976	Jan. 4, 1977
B 452,883	3,981,735	Jan. 27, 1976	Sep. 21, 1976
B 452,915	4,013,933	Mar. 30, 1976	Mar. 22, 1977
B 452,938	3,994,719	Feb. 17, 1976	Nov. 30, 1976
B 452,944	4,009,773	Mar. 30, 1976	Mar. 1, 1977
B 453,031	3,998,678	Mar. 16, 1976	Dec. 21, 1976
B 453,067	4,005,394	Mar. 23, 1976	Jan. 25, 1977
B 453,238	3,997,063	Mar. 2, 1976	Dec. 14, 1976
B 453,432	4,000,514	Mar. 16, 1976	Dec. 28, 1976
B 453,533	3,997,744	Feb. 17, 1976	Dec. 14, 1976
B 453,616	3,987,376	Jan. 27, 1976	Oct. 19, 1976
B 453,759	3,989,790	Jan. 27, 1976	Nov. 2, 1976
B 453,960	4,014,701	Apr. 13, 1976	Mar. 29, 1977
B 454,283	3,995,153	Feb. 3, 1976	Nov. 30, 1976
B 454,833	4,008,733	Mar. 30, 1976	Feb. 22, 1977
B 455,425	3,990,060	Feb. 3, 1976	Nov. 2, 1976
B 455,481	3,991,092	Feb. 24, 1976	Nov. 9, 1976
B 455,486	4,001,353	Mar. 16, 1976	Jan. 4, 1977
B 455,686	4,001,156	Mar. 2, 1976	Jan. 4, 1977
B 455,759	3,984,242	Feb. 24, 1976	Oct. 5, 1976
B 455,806	3,998,919	Mar. 23, 1976	Dec. 21, 1976
B 456,069	3,998,991	Mar. 9, 1976	Dec. 21, 1976
B 456,148	3,984,269	Jan. 13, 1976	Oct. 5, 1976
B 456,153	3,997,992	Mar. 9, 1976	Dec. 21, 1976
B 456,384	4,014,859	Apr. 6, 1976	Mar. 29, 1977
B 456,579	3,993,715	Feb. 10, 1976	Nov. 23, 1976
B 456,869	4,001,277	Mar. 9, 1976	Jan. 4, 1977
B 456,900	3,996,262	Feb. 3, 1976	Dec. 7, 1976
B 456,905	4,013,431	Mar. 23, 1976	Mar. 22, 1977
B 457,547	3,996,397	Feb. 17, 1976	Dec. 7, 1976
B 457,850	3,993,586	Feb. 10, 1976	Nov. 23, 1976
B 457,862	3,987,195	Jan. 27, 1976	Oct. 19, 1976
B 457,886	3,988,498	Jan. 13, 1976	Oct. 26, 1976
B 457,931	4,001,229	Mar. 16, 1976	Jan. 4, 1977
B 458,500	3,997,805	Feb. 24, 1976	Dec. 14, 1976
B 458,617	3,984,422	Feb. 3, 1976	Oct. 5, 1976
B 458,964	3,996,615	Mar. 2, 1976	Dec. 7, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 459,190	4,010,786	Mar. 30, 1976	Mar. 8, 1977
B 459,381	4,000,017	Mar. 9, 1976	Dec. 28, 1976
B 459,408	4,018,890	Mar. 23, 1976	Apr. 19, 1977
B 459,597	3,996,711	Feb. 17, 1976	Dec. 14, 1976
B 459,811	3,982,173	Jan. 20, 1976	Sep. 21, 1976
B 459,821	4,005,954	Mar. 30, 1976	Feb. 1, 1977
B 460,388	3,989,448	Jan. 27, 1976	Nov. 2, 1976
B 460,441	3,981,828	Jan. 13, 1976	Sep. 21, 1976
B 460,846	3,985,817	Feb. 24, 1976	Oct. 12, 1976
B 461,184	3,992,482	Feb. 17, 1976	Nov. 16, 1976
B 461,250	4,000,768	Mar. 16, 1976	Jan. 4, 1977
B 461,336	3,982,231	Feb. 3, 1976	Sep. 21, 1976
B 461,352	3,981,681	Jan. 13, 1976	Sep. 21, 1976
B 461,685	4,013,661	Mar. 30, 1976	Mar. 22, 1977
B 461,752	4,016,541	Apr. 20, 1976	Apr. 5, 1977
B 461,874	3,982,276	Jan. 27, 1976	Sep. 21, 1976
B 462,030	4,009,342	Mar. 23, 1976	Feb. 22, 1977
B 462,386	3,988,188	Jan. 13, 1976	Oct. 26, 1976
B 462,424	3,989,602	Feb. 24, 1976	Nov. 2, 1976
B 462,828	3,998,395	Mar. 9, 1976	Dec. 21, 1976
B 462,893	3,984,253	Feb. 24, 1976	Oct. 5, 1976
B 463,322	3,989,982	Jan. 20, 1976	Nov. 2, 1976
B 463,388	3,992,605	Feb. 10, 1976	Nov. 16, 1976
B 463,473	4,002,068	Mar. 23, 1976	Jan. 11, 1977
B 463,591	4,015,051	Mar. 30, 1976	Mar. 29, 1977
B 463,671	3,985,385	Jan. 13, 1976	Oct. 12, 1976
B 464,027	3,999,390	Mar. 16, 1976	Dec. 28, 1976
B 464,290	3,990,307	Feb. 3, 1976	Nov. 9, 1976
B 464,491	4,015,612	Mar. 30, 1976	Apr. 5, 1977
B 464,587	3,991,091	Feb. 3, 1976	Nov. 9, 1976
B 464,593	3,997,659	Mar. 9, 1976	Dec. 14, 1976
B 465,145	3,981,148	Jan. 27, 1976	Sep. 21, 1976
B 465,202	3,989,757	Feb. 24, 1976	Nov. 2, 1976
B 465,393	3,987,390	Jan. 27, 1976	Oct. 19, 1976
B 465,688	3,989,770	Jan. 27, 1976	Nov. 2, 1976
B 465,955	3,997,502	Feb. 3, 1976	Dec. 14, 1976
B 466,304	4,007,095	Mar. 23, 1976	Feb. 8, 1977
B 466,318	3,999,115	Mar. 9, 1976	Dec. 21, 1976
B 466,390	3,983,349	Feb. 24, 1976	Sep. 28, 1976
B 466,419	4,011,087	Mar. 23, 1976	Mar. 8, 1977
B 466,444	3,986,039	Jan. 20, 1976	Oct. 12, 1976
B 466,906	3,993,037	Mar. 16, 1976	Nov. 23, 1976
B 466,929	3,991,195	Jan. 27, 1976	Nov. 9, 1976
B 467,250	3,997,428	Feb. 3, 1976	Dec. 14, 1976
B 467,328	3,997,599	Mar. 9, 1976	Dec. 14, 1976
B 467,412	3,981,265	Jan. 13, 1976	Sep. 21, 1976
B 467,486	3,991,725	Mar. 16, 1976	Nov. 16, 1976
B 467,971	3,983,453	Jan. 13, 1976	Sep. 28, 1976
B 468,052	3,988,335	Feb. 10, 1976	Oct. 26, 1976
B 468,100	3,995,107	Mar. 9, 1976	Nov. 30, 1976
B 468,330	4,001,475	Mar. 16, 1976	Jan. 4, 1977
B 468,350	3,981,922	Jan. 13, 1976	Sep. 21, 1976
B 468,421	4,014,739	Mar. 30, 1976	Mar. 29, 1977
B 468,603	4,003,839	Mar. 23, 1976	Jan. 18, 1977
B 469,036	4,005,926	Mar. 16, 1976	Feb. 1, 1977
B 469,468	4,000,220	Mar. 16, 1976	Dec. 28, 1976
B 469,947	3,984,153	Jan. 20, 1976	Oct. 5, 1976
B 470,170	3,986,410	Jan. 13, 1976	Oct. 19, 1976
B 470,305	4,014,043	Apr. 6, 1976	Mar. 22, 1977
B 470,348	3,981,929	Jan. 13, 1976	Sep. 21, 1976
B 470,576	3,997,507	Feb. 24, 1976	Dec. 14, 1976
B 470,601	3,985,655	Mar. 9, 1976	Oct. 12, 1976
B 470,798	3,987,480	Jan. 20, 1976	Oct. 19, 1976
B 470,853	4,002,101	Mar. 23, 1976	Jan. 11, 1977
B 470,899	3,996,441	Mar. 2, 1976	Dec. 7, 1976
B 470,900	4,001,213	Mar. 2, 1976	Jan. 4, 1977
B 470,945	4,014,848	Apr. 13, 1976	Mar. 29, 1977
B 471,116	4,001,318	Feb. 17, 1976	Jan. 4, 1977
B 471,221	3,981,974	Jan. 13, 1976	Sep. 21, 1976
B 471,405	3,993,576	Feb. 10, 1976	Nov. 23, 1976
B 471,494	3,993,660	Mar. 16, 1976	Nov. 23, 1976
B 471,579	3,985,689	Jan. 13, 1976	Oct. 12, 1976
B 471,617	3,994,871	Feb. 10, 1976	Nov. 30, 1976
B 471,681	4,012,844	Apr. 13, 1976	Mar. 22, 1977
B 471,735	3,989,408	Feb. 3, 1976	Nov. 2, 1976
B 471,836	4,000,150	Feb. 24, 1976	Dec. 28, 1976
B 472,241	3,992,453	Feb. 17, 1976	Nov. 16, 1976
B 472,256	3,985,789	Jan. 13, 1976	Oct. 12, 1976
B 472,284	3,982,078	Jan. 13, 1976	Sep. 21, 1976
B 472,591	4,013,029	Apr. 6, 1976	Mar. 22, 1977
B 472,760	4,001,330	Apr. 13, 1976	Jan. 4, 1977
B 473,039	3,985,747	Feb. 10, 1976	Oct. 12, 1976
B 473,040	3,985,738	Feb. 10, 1976	Oct. 12, 1976
B 473,813	3,989,071	Mar. 9, 1976	Nov. 2, 1976
B 473,972	3,984,043	Jan. 13, 1976	Oct. 5, 1976
B 474,573	3,988,375	Jan. 20, 1976	Oct. 26, 1976
B 474,747	3,997,704	Feb. 24, 1976	Dec. 14, 1976
B 475,236	3,989,990	Feb. 3, 1976	Nov. 2, 1976
B 475,385	4,001,071	Mar. 9, 1976	Jan. 4, 1977
B 475,681	3,983,332	Jan. 20, 1976	Sep. 28, 1976
B 476,267	4,005,068	Apr. 6, 1976	Jan. 25, 1977
B 476,372	3,985,771	Feb. 24, 1976	Oct. 12, 1976
B 476,542	4,013,549	Mar. 30, 1976	Mar. 22, 1977
B 476,568	3,999,456	Mar. 16, 1976	Dec. 28, 1976
B 476,577	3,982,070	Jan. 20, 1976	Sep. 21, 1976
B 476,681	3,986,181	Jan. 13, 1976	Oct. 12, 1976
B 476,776	3,998,715	Mar. 23, 1976	Dec. 21, 1976
B 476,967	3,995,206	Mar. 9, 1976	Nov. 30, 1976
B 477,252	3,985,759	Jan. 13, 1976	Oct. 12, 1976
B 477,481	3,991,076	Feb. 3, 1976	Nov. 9, 1976
B 477,584	D 242,855	Apr. 6, 1976	Dec. 28, 1976
B 477,597	3,993,912	Feb. 17, 1976	Nov. 23, 1976
B 477,892	4,010,355	Mar. 30, 1976	Mar. 1, 1977
B 478,234	4,010,421	Mar. 30, 1976	Mar. 1, 1977
B 478,739	3,992,253	Feb. 17, 1976	Nov. 16, 1976
B 479,175	3,985,700	Feb. 17, 1976	Oct. 12, 1976
B 479,242	3,983,074	Feb. 17, 1976	Sep. 28, 1976
B 479,502	3,999,030	Mar. 16, 1976	Dec. 21, 1976
B 479,681	D 242,672	Mar. 16, 1976	Dec. 14, 1976
B 479,969	4,001,132	Mar. 9, 1976	Jan. 4, 1977
B 480,114	4,001,327	Mar. 2, 1976	Jan. 4, 1977
B 480,251	4,008,700	Mar. 23, 1976	Feb. 22, 1977
B 480,287	4,006,029	Mar. 30, 1976	Feb. 1, 1977
B 480,292	3,994,011	Mar. 16, 1976	Nov. 23, 1976
B 480,350	3,994,164	Feb. 10, 1976	Nov. 30, 1976
B 480,384	3,999,737	Mar. 23, 1976	Dec. 28, 1976
B 480,452	3,994,923	Feb. 10, 1976	Nov. 30, 1976
B 480,473	3,995,608	Mar. 2, 1976	Dec. 7, 1976
B 480,604	3,985,251	Jan. 13, 1976	Oct. 12, 1976
B 480,625	3,996,227	Feb. 24, 1976	Dec. 7, 1976
B 480,662	3,988,382	Mar. 2, 1976	Oct. 26, 1976
B 480,740	3,996,431	Mar. 2, 1976	Dec. 7, 1976
B 480,749	3,999,207	Mar. 9, 1976	Dec. 21, 1976
B 480,987	4,001,459	Mar. 30, 1976	Jan. 4, 1977
B 481,048	3,998,542	Mar. 16, 1976	Dec. 21, 1976
B 481,190	4,013,468	Mar. 30, 1976	Mar. 22, 1977
B 481,600	3,981,235	Jan. 27, 1976	Sep. 21, 1976
B 481,737	3,982,057	Jan. 13, 1976	Sep. 21, 1976
B 481,778	4,001,385	Mar. 30, 1976	Jan. 4, 1977
B 481,930	3,992,717	Feb. 24, 1976	Nov. 16, 1976
B 481,989	4,008,337	Mar. 23, 1976	Feb. 15, 1977
B 482,058	4,001,398	Mar. 2, 1976	Jan. 4, 1977
B 482,660	3,995,026	Feb. 10, 1976	Nov. 30, 1976
B 482,709	3,985,733	Feb. 24, 1976	Oct. 12, 1976
B 482,907	3,984,811	Jan. 20, 1976	Oct. 5, 1976
B 483,247	4,001,889	Apr. 13, 1976	Jan. 4, 1977
B 483,256	3,981,723	Feb. 10, 1976	Sep. 21, 1976
B 483,268	3,995,215	Mar. 9, 1976	Nov. 30, 1976
B 483,606	3,986,990	Jan. 27, 1976	Oct. 19, 1976
B 483,615	3,988,637	Jan. 27, 1976	Oct. 26, 1976
B 483,746	4,014,923	Mar. 23, 1976	Mar. 29, 1977
B 483,762	3,993,608	Feb. 10, 1976	Nov. 23, 1976
B 483,865	3,985,693	Jan. 13, 1976	Oct. 12, 1976
B 484,029	3,983,558	Feb. 10, 1976	Sep. 28, 1976
B 484,067	3,992,374	Feb. 17, 1976	Nov. 16, 1976
B 484,068	3,994,937	Mar. 2, 1976	Nov. 30, 1976
B 484,121	3,997,770	Mar. 16, 1976	Dec. 14, 1976
B 484,269	4,000,159	Feb. 10, 1976	Dec. 28, 1976
B 484,332	3,986,540	Mar. 2, 1976	Oct. 19, 1976
B 484,365	3,983,578	Jan. 27, 1976	Sep. 28, 1976
B 484,419	4,001,292	Mar. 9, 1976	Jan. 4, 1977
B 484,437	4,013,740	Mar. 30, 1976	Mar. 22, 1977
B 484,482	3,994,017	Mar. 23, 1976	Nov. 23, 1976
B 484,769	3,999,498	Mar. 16, 1976	Dec. 28, 1976
B 485,051	3,992,418	Feb. 17, 1976	Nov. 16, 1976
B 485,060	3,983,067	Feb. 17, 1976	Sep. 28, 1976
B 485,169	3,989,791	Mar. 16, 1976	Nov. 2, 1976
B 485,188	4,001,170	Mar. 16, 1976	Jan. 4, 1977
B 485,401	3,985,859	Jan. 27, 1976	Oct. 12, 1976
B 485,575	3,996,565	Feb. 24, 1976	Dec. 7, 1976
B 485,926	4,006,357	Mar. 23, 1976	Feb. 1, 1977
B 485,972	4,017,472	Mar. 23, 1976	Apr. 12, 1977
B 486,280	3,983,130	Feb. 3, 1976	Sep. 28, 1976
B 486,614	3,995,835	Feb. 17, 1976	Dec. 7, 1976
B 486,678	4,001,273	Mar. 2, 1976	Jan. 4, 1977
B 486,828	3,989,651	Mar. 2, 1976	Nov. 2, 1976
B 487,062	D 241,256	Feb. 10, 1976	Nov. 9, 1976
B 487,078	4,012,895	Mar. 30, 1976	Mar. 22, 1977
B 487,133	3,989,826	Jan. 27, 1976	Nov. 2, 1976
B 487,260	3,990,610	Jan. 27, 1976	Nov. 9, 1976
B 487,411	3,983,579	Feb. 24, 1976	Sep. 28, 1976
B 487,423	3,998,810	Mar. 2, 1976	Dec. 21, 1976
B 487,427	3,995,788	Mar. 2, 1976	Dec. 7, 1976
B 487,467	4,014,847	Apr. 13, 1976	Mar. 29, 1977

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 487,529	4,022,750	Mar. 30, 1976	May 10, 1977
B 488,111	3,985,765	Jan. 13, 1976	Oct. 12, 1976
B 488,395	3,982,245	Jan. 27, 1976	Sep. 21, 1976
B 488,634	3,982,158	Jan. 20, 1976	Sep. 21, 1976
B 488,756	3,991,810	Mar. 16, 1976	Nov. 16, 1976
B 488,836	4,013,121	Mar. 30, 1976	Mar. 22, 1977
B 489,290	3,998,081	Feb. 17, 1976	Dec. 21, 1976
B 489,328	3,990,088	Jan. 20, 1976	Nov. 2, 1976
B 489,331	3,996,175	Feb. 17, 1976	Dec. 7, 1976
B 489,485	D 243,266	Apr. 13, 1976	Feb. 1, 1977
B 489,550	4,000,710	Mar. 16, 1976	Jan. 4, 1977
B 489,685	3,984,085	Feb. 24, 1976	Oct. 5, 1976
B 490,067	3,986,600	Jan. 27, 1976	Oct. 19, 1976
B 490,547	3,999,439	Feb. 24, 1976	Dec. 28, 1976
B 490,551	D 243,168	Apr. 6, 1976	Jan. 25, 1977
B 490,589	3,990,680	Feb. 3, 1976	Nov. 9, 1976
B 490,623	3,996,964	Mar. 2, 1976	Dec. 14, 1976
B 490,647	3,985,196	Feb. 24, 1976	Oct. 12, 1976
B 490,806	3,989,486	Feb. 3, 1976	Nov. 2, 1976
B 490,812	3,998,842	Mar. 30, 1976	Dec. 21, 1976
B 490,946	3,993,652	Feb. 17, 1976	Nov. 23, 1976
B 490,995	3,995,031	Feb. 3, 1976	Nov. 30, 1976
B 491,032	3,981,892	Feb. 10, 1976	Sep. 21, 1976
B 491,052	3,985,790	Mar. 2, 1976	Oct. 12, 1976
B 491,111	3,997,916	Feb. 17, 1976	Dec. 14, 1976
B 491,455	3,991,167	Feb. 3, 1976	Nov. 9, 1976
B 491,501	3,984,914	Jan. 13, 1976	Oct. 12, 1976
B 491,618	4,007,950	Mar. 16, 1976	Feb. 15, 1977
B 491,650	3,999,044	Mar. 9, 1976	Dec. 21, 1976
B 491,673	3,994,770	Feb. 17, 1976	Nov. 30, 1976
B 491,776	3,986,298	Mar. 16, 1976	Oct. 19, 1976
B 491,883	3,984,412	Feb. 3, 1976	Oct. 5, 1976
B 491,906	D 242,223	Feb. 10, 1976	Nov. 9, 1976
B 492,039	3,997,541	Feb. 24, 1976	Dec. 14, 1976
B 492,093	4,003,658	Mar. 23, 1976	Jan. 18, 1977
B 492,120	3,995,692	Feb. 24, 1976	Dec. 7, 1976
B 492,301	3,981,073	Jan. 13, 1976	Sep. 21, 1976
B 492,373	4,010,908	Mar. 30, 1976	Mar. 8, 1977
B 492,688	3,983,415	Jan. 20, 1976	Sep. 28, 1976
B 492,716	3,998,739	Mar. 2, 1976	Dec. 21, 1976
B 492,774	4,001,843	Mar. 9, 1976	Jan. 4, 1977
B 492,902	3,993,859	Feb. 24, 1976	Nov. 23, 1976
B 492,946	3,991,303	Jan. 27, 1976	Nov. 9, 1976
B 493,254	D 243,267	Apr. 13, 1976	Feb. 1, 1977
B 493,370	3,984,792	Mar. 16, 1976	Oct. 5, 1976
B 493,463	4,013,510	Mar. 23, 1976	Mar. 22, 1977
B 493,474	4,013,565	Mar. 23, 1976	Mar. 22, 1977
B 493,501	3,988,061	Feb. 3, 1976	Oct. 26, 1976
B 493,686	4,008,338	Mar. 23, 1976	Feb. 15, 1977
B 493,955	3,989,830	Mar. 9, 1976	Nov. 2, 1976
B 493,981	3,990,165	Mar. 9, 1976	Nov. 9, 1976
B 494,138	4,034,002	Mar. 23, 1976	July 5, 1977
B 494,234	3,983,808	Feb. 10, 1976	Oct. 5, 1976
B 494,339	4,001,255	Mar. 16, 1976	Jan. 4, 1977
B 494,383	3,991,289	Feb. 3, 1976	Nov. 9, 1976
B 494,669	3,991,104	Feb. 3, 1976	Nov. 9, 1976
B 494,691	3,987,457	Mar. 16, 1976	Oct. 19, 1976
B 494,806	3,989,210	Feb. 3, 1976	Nov. 2, 1976
B 494,944	3,992,469	Feb. 17, 1976	Nov. 16, 1976
B 495,185	3,999,166	Mar. 9, 1976	Dec. 21, 1976
B 495,331	4,000,456	Mar. 16, 1976	Dec. 28, 1976
B 495,402	3,983,988	Feb. 17, 1976	Oct. 5, 1976
B 495,408	4,000,222	Feb. 3, 1976	Dec. 28, 1976
B 495,489	3,984,571	Feb. 3, 1976	Oct. 5, 1976
B 495,550	3,993,666	Feb. 3, 1976	Nov. 23, 1976
B 495,554	3,993,665	Feb. 3, 1976	Nov. 23, 1976
B 495,759	3,989,998	Feb. 3, 1976	Nov. 2, 1976
B 495,781	4,013,699	Mar. 23, 1976	Mar. 22, 1977
B 495,903	3,995,997	Feb. 17, 1976	Dec. 7, 1976
B 496,430	3,991,140	Feb. 10, 1976	Nov. 9, 1976
B 496,431	3,985,894	Jan. 13, 1976	Oct. 12, 1976
B 496,487	3,982,261	Jan. 20, 1976	Sep. 21, 1976
B 496,500	3,985,962	Feb. 3, 1976	Oct. 12, 1976
B 496,502	3,987,444	Jan. 20, 1976	Oct. 19, 1976
B 496,792	3,999,959	Feb. 17, 1976	Dec. 28, 1976
B 496,964	3,999,219	Apr. 20, 1976	Dec. 21, 1976
B 496,999	3,983,804	Jan. 27, 1976	Oct. 5, 1976
B 497,021	3,985,039	Jan. 13, 1976	Oct. 12, 1976
B 497,194	3,988,267	Feb. 3, 1976	Oct. 26, 1976
B 497,292	3,994,052	Feb. 3, 1976	Nov. 30, 1976
B 497,293	4,011,412	Mar. 30, 1976	Mar. 8, 1977
B 497,473	3,990,839	Feb. 3, 1976	Nov. 9, 1976
B 497,571	4,009,997	Mar. 23, 1976	Mar. 1, 1977
B 497,584	3,988,184	Feb. 24, 1976	Oct. 26, 1976
B 497,702	3,996,589	Mar. 2, 1976	Dec. 7, 1976
B 497,780	3,997,500	Feb. 24, 1976	Dec. 14, 1976
B 497,853	3,987,934	Feb. 17, 1976	Oct. 26, 1976
B 497,896	D 243,091	Apr. 6, 1976	Jan. 18, 1977
B 497,960	3,991,325	Jan. 20, 1976	Nov. 9, 1976
B 498,208	4,001,480	Apr. 13, 1976	Jan. 4, 1977
B 498,288	4,013,657	Mar. 23, 1976	Mar. 22, 1977
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,205	3,989,611	Feb. 10, 1976	Nov. 2, 1976
B 498,500	3,982,241	Jan. 20, 1976	Sep. 21, 1976
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,820	3,996,670	Mar. 9, 1976	Dec. 14, 1976
B 498,951	3,996,907	Mar. 2, 1976	Dec. 14, 1976
B 499,171	3,985,192	Jan. 27, 1976	Oct. 12, 1976
B 499,209	3,995,907	Feb. 24, 1976	Dec. 7, 1976
B 499,227	3,981,344	Jan. 27, 1976	Sep. 21, 1976
B 499,324	4,001,375	Mar. 16, 1976	Jan. 4, 1977
B 499,352	3,981,391	Jan. 27, 1976	Sep. 21, 1976
B 499,370	4,013,544	Mar. 30, 1976	Mar. 22, 1977
B 499,718	3,990,058	Jan. 27, 1976	Nov. 2, 1976
B 499,786	4,000,663	Mar. 16, 1976	Jan. 4, 1977
B 500,171	3,997,262	Mar. 30, 1976	Dec. 14, 1976
B 500,176	3,995,316	Feb. 3, 1976	Nov. 30, 1976
B 500,408	D 242,721	Mar. 16, 1976	Dec. 14, 1976
B 500,945	3,996,817	Feb. 24, 1976	Dec. 14, 1976
B 500,959	4,014,853	Apr. 13, 1976	Mar. 29, 1977
B 500,981	3,984,681	Jan. 27, 1976	Oct. 5, 1976
B 501,122	3,981,385	Feb. 17, 1976	Sep. 21, 1976
B 501,181	3,984,761	Feb. 10, 1976	Oct. 5, 1976
B 501,253	3,994,015	Feb. 3, 1976	Nov. 23, 1976
B 501,317	3,985,643	Jan. 13, 1976	Oct. 12, 1976
B 501,379	4,013,696	Mar. 30, 1976	Mar. 22, 1977
B 501,415	3,982,051	Jan. 13, 1976	Sep. 21, 1976
B 501,482	4,012,650	Jan. 13, 1976	Mar. 15, 1977
B 501,503	4,001,640	Mar. 2, 1976	Jan. 4, 1977
B 501,540	3,985,694	Jan. 13, 1976	Oct. 12, 1976
B 501,975	3,998,466	Mar. 2, 1976	Dec. 21, 1976
B 501,993	3,981,606	Jan. 13, 1976	Sep. 21, 1976
B 502,151	3,998,614	Mar. 23, 1976	Dec. 21, 1976
B 502,161	4,000,500	Mar. 2, 1976	Dec. 28, 1976
B 502,289	3,982,274	Jan. 13, 1976	Sep. 21, 1976
B 502,381	D 242,231	Mar. 16, 1976	Nov. 9, 1976
B 502,540	3,983,698	Jan. 13, 1976	Oct. 5, 1976
B 502,571	D 242,433	Apr. 6, 1976	Nov. 23, 1976
B 502,589	3,989,652	Jan. 27, 1976	Nov. 2, 1976
B 502,652	3,989,186	Feb. 24, 1976	Nov. 2, 1976
B 502,667	3,991,431	Feb. 24, 1976	Nov. 16, 1976
B 502,973	3,982,161	Jan. 27, 1976	Sep. 21, 1976
B 502,993	3,992,489	Feb. 17, 1976	Nov. 16, 1976
B 503,029	3,986,879	Jan. 27, 1976	Oct. 19, 1976
B 503,345	4,001,235	Feb. 24, 1976	Jan. 4, 1977
B 503,371	4,009,401	Mar. 30, 1976	Feb. 22, 1977
B 503,436	3,988,819	Feb. 24, 1976	Nov. 2, 1976
B 503,456	4,007,702	Mar. 23, 1976	Feb. 15, 1977
B 503,521	3,999,646	Mar. 16, 1976	Dec. 28, 1976
B 503,579	3,989,680	Feb. 10, 1976	Nov. 2, 1976
B 503,618	3,997,782	Mar. 9, 1976	Dec. 14, 1976
B 503,742	3,989,756	Feb. 17, 1976	Nov. 2, 1976
B 503,776	4,016,000	Mar. 23, 1976	Apr. 5, 1977
B 503,780	3,990,055	Mar. 16, 1976	Nov. 2, 1976
B 503,817	3,988,307	Jan. 13, 1976	Oct. 26, 1976
B 504,056	3,993,923	Feb. 24, 1976	Nov. 23, 1976
B 504,061	3,987,534	Mar. 16, 1976	Oct. 26, 1976
B 504,156	3,999,048	Mar. 23, 1976	Dec. 21, 1976
B 504,169	3,981,219	Jan. 13, 1976	Sep. 21, 1976
B 504,404	3,996,499	Feb. 24, 1976	Dec. 7, 1976
B 504,405	4,007,401	Apr. 13, 1976	Feb. 8, 1977
B 504,439	3,999,398	Mar. 16, 1976	Dec. 28, 1976
B 504,503	3,999,210	Mar. 9, 1976	Dec. 21, 1976
B 504,582	4,005,138	Mar. 30, 1976	Jan. 25, 1977
B 504,778	3,986,650	Feb. 24, 1976	Oct. 19, 1976
B 504,877	3,997,564	Feb. 24, 1976	Dec. 14, 1976
B 504,899	3,991,273	Mar. 9, 1976	Nov. 9, 1976
B 505,126	3,981,745	Feb. 10, 1976	Sep. 21, 1976
B 505,221	4,013,627	Mar. 30, 1976	Mar. 22, 1977
B 505,582	4,001,659	Mar. 23, 1976	Jan. 4, 1977
B 505,689	3,987,631	Mar. 2, 1976	Oct. 26, 1976
B 505,813	3,985,175	Jan. 13, 1976	Oct. 12, 1976
B 506,144	3,991,147	Feb. 10, 1976	Nov. 9, 1976
B 506,148	3,988,319	Feb. 3, 1976	Oct. 26, 1976
B 506,167	3,990,652	Feb. 10, 1976	Nov. 9, 1976
B 506,286	3,982,085	Jan. 20, 1976	Sep. 21, 1976
B 506,461	3,987,348	Jan. 20, 1976	Oct. 19, 1976
B 506,566	3,985,402	Jan. 20, 1976	Oct. 12, 1976
B 506,624	3,999,695	Mar. 9, 1976	Dec. 28, 1976
B 506,648	3,994,857	Feb. 3, 1976	Nov. 30, 1976
B 506,744	3,981,176	Jan. 13, 1976	Sep. 21, 1976
B 506,760	4,012,835	Apr. 13, 1976	Mar. 22, 1977
B 506,839	4,005,389	Mar. 23, 1976	Jan. 25, 1977
B 506,840	4,002,928	Mar. 23, 1976	Jan. 11, 1977

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 506,916	3,986,140	Feb. 3, 1976	Oct. 12, 1976
B 506,926	3,993,232	Feb. 17, 1976	Nov. 23, 1976
B 507,087	3,991,389	Feb. 17, 1976	Nov. 9, 1976
B 507,131	4,000,499	Mar. 2, 1976	Dec. 28, 1976
B 507,166	4,014,738	Apr. 13, 1976	Mar. 29, 1977
B 507,396	3,995,167	Feb. 10, 1976	Nov. 30, 1976
B 507,476	3,994,680	Feb. 10, 1976	Nov. 30, 1976
B 507,647	3,982,240	Jan. 27, 1976	Sep. 21, 1976
B 508,118	3,992,283	Feb. 17, 1976	Nov. 16, 1976
B 508,119	3,992,285	Feb. 17, 1976	Nov. 16, 1976
B 508,369	3,985,847	Jan. 13, 1976	Oct. 12, 1976
B 508,639	4,004,194	Mar. 23, 1976	Jan. 18, 1977
B 508,817	3,989,891	Feb. 3, 1976	Nov. 2, 1976
B 508,878	3,994,117	Feb. 3, 1976	Nov. 30, 1976
B 508,940	3,981,321	Feb. 17, 1976	Sep. 21, 1976
B 508,961	3,987,477	Feb. 3, 1976	Oct. 19, 1976
B 509,043	3,996,767	Feb. 24, 1976	Dec. 14, 1976
B 509,165	3,999,155	Mar. 2, 1976	Dec. 21, 1976
B 509,185	3,989,996	Feb. 3, 1976	Nov. 2, 1976
B 509,238	3,982,399	Feb. 24, 1976	Sep. 28, 1976
B 509,474	3,997,260	Feb. 17, 1976	Dec. 14, 1976
B 509,586	4,006,645	Feb. 3, 1976	Feb. 8, 1977
B 509,606	3,989,986	Feb. 3, 1976	Nov. 2, 1976
B 509,772	3,999,004	Mar. 16, 1976	Dec. 21, 1976
B 509,819	4,014,712	Apr. 13, 1976	Mar. 29, 1977
B 510,026	4,016,763	Apr. 13, 1976	Apr. 12, 1977
B 510,184	D 242,784	Apr. 6, 1976	Dec. 21, 1976
B 510,278	4,008,972	Mar. 30, 1976	Feb. 22, 1977
B 510,281	3,993,215	Mar. 9, 1976	Nov. 23, 1976
B 510,346	D 242,207	Feb. 10, 1976	Nov. 9, 1976
B 510,458	4,000,221	Feb. 10, 1976	Dec. 28, 1976
B 510,521	3,990,656	Mar. 2, 1976	Nov. 9, 1976
B 510,588	3,981,539	Jan. 27, 1976	Sep. 21, 1976
B 510,677	3,989,541	Feb. 24, 1976	Nov. 2, 1976
B 510,682	4,000,978	Mar. 30, 1976	Jan. 4, 1977
B 510,836	4,013,795	Mar. 23, 1976	Mar. 22, 1977
B 510,850	3,989,841	Feb. 3, 1976	Nov. 2, 1976
B 510,855	3,981,059	Jan. 27, 1976	Sep. 21, 1976
B 511,907	3,999,622	Mar. 30, 1976	Dec. 28, 1976
B 510,998	3,992,336	Feb. 10, 1976	Nov. 16, 1976
B 511,002	3,998,717	Mar. 2, 1976	Dec. 21, 1976
B 511,099	3,990,162	Feb. 3, 1976	Nov. 9, 1976
B 511,156	3,981,364	Jan. 27, 1976	Sep. 21, 1976
B 511,346	3,984,072	Jan. 27, 1976	Oct. 5, 1976
B 511,407	3,981,485	Feb. 10, 1976	Sep. 21, 1976
B 511,454	3,982,333	Feb. 24, 1976	Sep. 28, 1976
B 511,665	4,001,037	Mar. 2, 1976	Jan. 4, 1977
B 511,885	3,981,346	Jan. 27, 1976	Sep. 21, 1976
B 511,886	3,989,991	Feb. 3, 1976	Nov. 2, 1976
B 511,909	3,981,183	Feb. 17, 1976	Sep. 21, 1976
B 512,324	3,985,084	Feb. 17, 1976	Oct. 12, 1976
B 512,547	3,984,193	Jan. 13, 1976	Oct. 5, 1976
B 512,745	3,981,294	Jan. 13, 1976	Sep. 21, 1976
B 512,779	4,014,897	Apr. 13, 1976	Mar. 29, 1977
B 512,818	3,997,363	Apr. 6, 1976	Dec. 14, 1976
B 512,849	3,982,141	Feb. 3, 1976	Sep. 21, 1976
B 512,964	3,995,279	Feb. 10, 1976	Nov. 30, 1976
B 513,014	3,991,113	Feb. 10, 1976	Nov. 9, 1976
B 513,027	3,995,143	Feb. 17, 1976	Nov. 30, 1976
B 513,134	4,006,764	Mar. 23, 1976	Feb. 8, 1977
B 513,280	3,988,211	Jan. 20, 1976	Oct. 26, 1976
B 513,368	3,982,138	Feb. 3, 1976	Sep. 21, 1976
B 513,706	3,986,064	Jan. 13, 1976	Oct. 12, 1976
B 513,756	3,993,869	Feb. 3, 1976	Nov. 23, 1976
B 513,781	4,001,324	Feb. 24, 1976	Jan. 4, 1977
B 513,789	3,981,599	Feb. 3, 1976	Sep. 21, 1976
B 513,791	4,008,608	Mar. 30, 1976	Feb. 22, 1977
B 514,259	4,013,649	Mar. 23, 1976	Mar. 22, 1977
B 514,687	3,986,522	Jan. 27, 1976	Oct. 19, 1976
B 514,839	4,033,816	Mar. 2, 1976	July 5, 1977
B 515,135	3,990,085	Feb. 17, 1976	Nov. 2, 1976
B 515,303	3,987,939	Jan. 20, 1976	Oct. 26, 1976
B 515,368	4,014,733	Apr. 6, 1976	Mar. 29, 1977
B 515,452	3,995,243	Feb. 10, 1976	Nov. 30, 1976
B 515,455	3,982,149	Jan. 27, 1976	Sep. 21, 1976
B 515,642	4,001,258	Feb. 24, 1976	Jan. 4, 1977
B 515,908	3,984,676	Jan. 20, 1976	Oct. 5, 1976
B 516,002	3,988,638	Jan. 13, 1976	Oct. 26, 1976
B 516,032	3,986,634	Jan. 27, 1976	Oct. 19, 1976
B 516,047	3,985,741	Feb. 10, 1976	Oct. 12, 1976
B 516,060	3,983,572	Feb. 17, 1976	Sep. 28, 1976
B 516,069	3,986,208	Mar. 16, 1976	Oct. 12, 1976
B 516,296	3,984,404	Feb. 3, 1976	Oct. 5, 1976
B 516,537	3,996,784	Feb. 17, 1976	Dec. 14, 1976
B 516,564	3,993,931	Feb. 17, 1976	Nov. 23, 1976
B 516,609	3,994,486	Feb. 24, 1976	Nov. 30, 1976
B 516,625	4,013,542	Mar. 30, 1976	Mar. 22, 1977
B 516,804	3,991,209	Mar. 23, 1976	Nov. 9, 1976
B 516,825	3,988,885	Feb. 3, 1976	Nov. 2, 1976
B 517,273	D 242,798	Mar. 16, 1976	Dec. 21, 1976
B 517,504	3,999,855	Mar. 9, 1976	Dec. 28, 1976
B 517,668	4,013,423	Apr. 6, 1976	Mar. 22, 1977
B 517,762	3,986,065	Mar. 16, 1976	Oct. 12, 1976
B 517,858	4,000,999	Feb. 17, 1976	Jan. 4, 1977
B 517,956	D 243,088	Apr. 6, 1976	Jan. 18, 1977
B 517,957	D 243,089	Apr. 6, 1976	Jan. 18, 1977
B 518,076	4,014,914	Mar. 30, 1976	Mar. 29, 1977
B 518,226	3,993,509	Feb. 10, 1976	Nov. 23, 1976
B 518,326	4,008,282	Mar. 23, 1976	Feb. 15, 1977
B 518,656	3,989,732	Feb. 17, 1976	Nov. 2, 1976
B 518,859	3,989,971	Feb. 3, 1976	Nov. 2, 1976
B 518,999	3,990,323	Feb. 3, 1976	Nov. 9, 1976
B 519,095	3,993,621	Feb. 24, 1976	Nov. 23, 1976
B 519,355	4,014,829	Apr. 13, 1976	Mar. 29, 1977
B 519,377	3,987,223	Jan. 27, 1976	Oct. 19, 1976
B 519,446	3,985,815	Feb. 24, 1976	Oct. 12, 1976
B 519,485	3,991,134	Feb. 10, 1976	Nov. 9, 1976
B 519,486	3,992,481	Feb. 17, 1976	Nov. 16, 1976
B 519,487	3,992,337	Feb. 17, 1976	Nov. 16, 1976
B 519,599	3,995,350	Feb. 17, 1976	Dec. 7, 1976
B 519,623	4,012,049	Apr. 6, 1976	Mar. 15, 1977
B 519,680	4,014,660	Mar. 30, 1976	Mar. 29, 1977
B 519,932	3,988,618	Feb. 3, 1976	Oct. 26, 1976
B 519,979	3,982,067	Feb. 3, 1976	Sep. 21, 1976
B 520,063	3,989,934	Mar. 2, 1976	Nov. 2, 1976
B 520,075	3,989,935	Feb. 24, 1976	Nov. 2, 1976
B 520,076	3,989,936	Mar. 2, 1976	Nov. 2, 1976
B 520,082	3,989,937	Mar. 23, 1976	Nov. 2, 1976
B 520,115	4,003,072	Mar. 23, 1976	Jan. 11, 1977
B 520,227	4,002,823	Mar. 30, 1976	Jan. 11, 1977
B 520,256	3,985,730	Jan. 13, 1976	Oct. 12, 1976
B 520,277	3,995,635	Feb. 17, 1976	Dec. 7, 1976
B 520,341	3,992,028	Mar. 16, 1976	Nov. 16, 1976
B 520,384	3,986,592	Jan. 27, 1976	Oct. 19, 1976
B 520,514	3,988,308	Mar. 9, 1976	Oct. 26, 1976
B 520,534	3,997,119	Feb. 17, 1976	Dec. 14, 1976
B 520,543	3,986,768	Jan. 27, 1976	Oct. 19, 1976
B 520,546	4,001,133	Mar. 2, 1976	Jan. 4, 1977
B 520,613	3,991,341	Mar. 16, 1976	Nov. 9, 1976
B 520,658	3,998,778	Mar. 9, 1976	Dec. 21, 1976
B 520,878	4,014,849	Apr. 6, 1976	Mar. 29, 1977
B 520,884	4,000,433	Mar. 16, 1976	Dec. 28, 1976
B 520,924	3,982,113	Jan. 27, 1976	Sep. 21, 1976
B 520,928	3,983,617	Jan. 13, 1976	Oct. 5, 1976
B 520,952	4,000,876	Mar. 16, 1976	Jan. 4, 1977
B 520,995	4,009,996	Mar. 23, 1976	Mar. 1, 1977
B 521,025	3,998,838	Mar. 23, 1976	Dec. 21, 1976
B 521,044	3,983,435	Feb. 24, 1976	Sep. 28, 1976
B 521,045	3,983,433	Feb. 24, 1976	Sep. 28, 1976
B 521,046	3,983,434	Feb. 24, 1976	Sep. 28, 1976
B 521,125	3,994,865	Feb. 10, 1976	Nov. 30, 1976
B 521,126	3,997,510	Feb. 10, 1976	Dec. 14, 1976
B 521,127	3,996,201	Feb. 17, 1976	Dec. 7, 1976
B 521,128	3,997,511	Feb. 10, 1976	Dec. 14, 1976
B 521,324	3,983,143	Jan. 27, 1976	Sep. 28, 1976
B 521,480	3,982,665	Jan. 13, 1976	Sep. 28, 1976
B 521,600	3,981,458	Jan. 27, 1976	Sep. 21, 1976
B 521,612	4,000,251	Mar. 9, 1976	Dec. 28, 1976
B 521,620	3,983,749	Jan. 27, 1976	Oct. 5, 1976
B 521,643	3,997,567	Mar. 2, 1976	Dec. 14, 1976
B 521,711	3,989,835	Feb. 10, 1976	Nov. 2, 1976
B 521,793	3,996,981	Feb. 24, 1976	Dec. 14, 1976
B 521,984	3,983,220	Feb. 17, 1976	Sep. 28, 1976
B 521,985	4,012,404	Mar. 23, 1976	Mar. 15, 1977
B 521,986	3,981,607	Feb. 3, 1976	Sep. 21, 1976
B 522,009	3,995,444	Feb. 17, 1976	Dec. 7, 1976
B 522,038	3,993,119	Feb. 3, 1976	Nov. 23, 1976
B 522,227	3,992,904	Mar. 30, 1976	Nov. 23, 1976
B 522,309	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 522,354	3,984,959	Jan. 20, 1976	Oct. 12, 1976
B 522,446	4,001,194	Mar. 30, 1976	Jan. 4, 1977
B 522,537	3,999,587	Mar. 30, 1976	Dec. 28, 1976
B 522,567	3,996,238	Feb. 17, 1976	Dec. 7, 1976
B 522,568	D 242,785	Apr. 6, 1976	Dec. 21, 1976
B 522,577	3,982,123	Jan. 27, 1976	Sep. 21, 1976
B 522,629	4,001,155	Mar. 16, 1976	Jan. 4, 1977
B 523,226	4,006,367	Mar. 23, 1976	Feb. 1, 1977
B 523,696	3,986,071	Jan. 13, 1976	Oct. 12, 1976
B 523,885	3,981,040	Feb. 17, 1976	Sep. 21, 1976
B 523,952	3,988,707	Mar. 23, 1976	Oct. 26, 1976
B 524,026	3,992,206	Feb. 10, 1976	Nov. 16, 1976
B 524,121	3,982,536	Feb. 3, 1976	Sep. 28, 1976
B 524,179	3,985,872	Jan. 13, 1976	Oct. 12, 1976
B 524,464	3,985,580	Feb. 10, 1976	Oct. 12, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 524,806	4,000,065	Mar. 2, 1976	Dec. 28, 1976
B 524,849	4,014,938	Mar. 23, 1976	Mar. 29, 1977
B 525,133	3,996,481	Mar. 23, 1976	Dec. 7, 1976
B 525,204	4,001,109	Mar. 16, 1976	Jan. 4, 1977
B 525,809	3,985,040	Feb. 24, 1976	Oct. 12, 1976
B 525,961	3,985,557	Jan. 13, 1976	Oct. 12, 1976
B 526,106	3,990,073	Jan. 27, 1976	Nov. 2, 1976
B 526,190	3,982,129	Feb. 17, 1976	Sep. 21, 1976
B 526,279	4,013,138	Apr. 13, 1976	Mar. 22, 1977
B 526,289	3,992,641	Feb. 24, 1976	Nov. 16, 1976
B 526,388	3,992,017	Feb. 3, 1976	Nov. 16, 1976
B 526,445	3,984,978	Jan. 20, 1976	Oct. 12, 1976
B 526,447	4,000,052	Feb. 24, 1976	Dec. 28, 1976
B 526,510	3,989,708	Jan. 20, 1976	Nov. 2, 1976
B 526,654	4,011,534	Mar. 23, 1976	Mar. 8, 1977
B 526,942	4,013,700	Mar. 30, 1976	Mar. 22, 1977
B 526,997	3,985,695	Jan. 13, 1976	Oct. 12, 1976
B 527,040	4,013,515	Mar. 23, 1976	Mar. 22, 1977
B 527,054	3,981,559	Feb. 17, 1976	Sep. 21, 1976
B 527,171	3,998,248	Mar. 9, 1976	Dec. 21, 1976
B 527,187	3,995,202	Feb. 17, 1976	Nov. 30, 1976
B 527,333	3,999,732	Mar. 23, 1976	Dec. 28, 1976
B 527,669	3,982,206	Jan. 13, 1976	Sep. 21, 1976
B 527,693	3,995,233	Feb. 3, 1976	Nov. 30, 1976
B 527,788	D 242,337	Feb. 10, 1976	Nov. 16, 1976
B 527,972	4,000,016	Mar. 9, 1976	Dec. 28, 1976
B 527,999	3,981,682	Feb. 3, 1976	Sep. 21, 1976
B 528,297	4,001,138	Mar. 16, 1976	Jan. 4, 1977
B 528,303	3,991,023	Feb. 10, 1976	Nov. 9, 1976
B 528,401	3,991,619	Feb. 3, 1976	Nov. 16, 1976
B 528,756	3,990,476	Feb. 3, 1976	Nov. 9, 1976
B 528,761	3,982,221	Feb. 10, 1976	Sep. 21, 1976
B 528,962	3,989,666	Feb. 24, 1976	Nov. 2, 1976
B 528,966	3,989,667	Feb. 24, 1976	Nov. 2, 1976
B 529,156	3,989,158	Jan. 13, 1976	Nov. 2, 1976
B 529,194	4,000,776	Mar. 23, 1976	Jan. 4, 1977
B 529,214	4,013,004	Apr. 20, 1976	Mar. 22, 1977
B 529,659	3,996,875	Feb. 24, 1976	Dec. 14, 1976
B 529,836	3,994,345	Feb. 3, 1976	Nov. 30, 1976
B 529,925	4,014,003	Mar. 30, 1976	Mar. 22, 1977
B 529,974	3,987,098	Feb. 17, 1976	Oct. 19, 1976
B 530,174	3,993,635	Feb. 24, 1976	Nov. 23, 1976
B 530,255	3,996,103	Mar. 2, 1976	Dec. 7, 1976
B 530,263	4,009,736	Mar. 30, 1976	Mar. 1, 1977
B 530,285	4,013,903	Apr. 6, 1976	Mar. 22, 1977
B 530,303	4,006,029	Mar. 23, 1976	Feb. 1, 1977
B 530,318	3,985,752	Jan. 13, 1976	Oct. 12, 1976
B 530,437	4,014,857	Apr. 13, 1976	Mar. 29, 1977
B 530,569	3,999,865	Mar. 16, 1976	Dec. 28, 1976
B 530,580	4,001,151	Mar. 2, 1976	Jan. 4, 1977
B 530,605	3,989,064	Feb. 3, 1976	Nov. 2, 1976
B 530,709	4,012,944	Apr. 6, 1976	Mar. 22, 1977
B 530,813	3,986,131	Feb. 17, 1976	Oct. 12, 1976
B 530,873	4,001,016	Feb. 17, 1976	Jan. 4, 1977
B 530,925	3,983,161	Feb. 24, 1976	Sep. 28, 1976
B 531,096	3,984,415	Feb. 10, 1976	Oct. 5, 1976
B 531,267	3,997,040	Feb. 24, 1976	Dec. 14, 1976
B 531,425	3,992,595	Feb. 3, 1976	Nov. 16, 1976
B 531,566	3,997,820	Mar. 16, 1976	Dec. 14, 1976
B 531,686	3,990,017	Mar. 23, 1976	Nov. 2, 1976
B 531,753	3,988,843	Mar. 2, 1976	Nov. 2, 1976
B 531,929	3,986,067	Jan. 20, 1976	Oct. 12, 1976
B 532,005	3,992,397	Feb. 24, 1976	Nov. 16, 1976
B 532,140	4,001,299	Mar. 2, 1976	Jan. 4, 1977
B 532,319	3,990,292	Feb. 3, 1976	Nov. 9, 1976
B 532,326	3,993,959	Mar. 23, 1976	Nov. 23, 1976
B 532,424	D 242,292	Feb. 10, 1976	Nov. 9, 1976
B 532,476	3,992,756	Feb. 3, 1976	Nov. 23, 1976
B 532,477	4,014,895	Apr. 13, 1976	Mar. 29, 1977
B 532,679	4,010,706	Apr. 6, 1976	Mar. 8, 1977
B 532,901	3,984,318	Jan. 13, 1976	Oct. 5, 1976
B 532,969	3,981,706	Jan. 13, 1976	Sep. 21, 1976
B 532,976	4,000,837	Mar. 23, 1976	Jan. 4, 1977
B 533,056	3,983,969	Jan. 13, 1976	Oct. 5, 1976
B 533,259	3,999,556	Feb. 24, 1976	Dec. 28, 1976
B 533,454	3,996,566	Mar. 2, 1976	Dec. 7, 1976
B 533,580	3,982,255	Feb. 3, 1976	Sep. 21, 1976
B 533,652	4,000,196	Mar. 23, 1976	Dec. 28, 1976
B 533,734	3,984,799	Jan. 27, 1976	Oct. 5, 1976
B 533,968	3,986,576	Jan. 27, 1976	Oct. 19, 1976
B 534,016	3,983,381	Feb. 3, 1976	Sep. 28, 1976
B 534,313	3,981,675	Jan. 27, 1976	Sep. 21, 1976
B 534,314	3,981,786	Feb. 10, 1976	Sep. 21, 1976
B 534,333	3,981,480	Feb. 17, 1976	Sep. 21, 1976
B 534,334	D 242,722	Mar. 16, 1976	Dec. 14, 1976
B 534,443	3,989,970	Jan. 27, 1976	Nov. 2, 1976
B 534,574	3,995,624	Feb. 24, 1976	Dec. 7, 1976
B 534,591	3,991,141	Feb. 17, 1976	Nov. 9, 1976
B 534,680	4,014,904	Apr. 20, 1976	Mar. 29, 1977
B 534,767	3,982,180	Feb. 3, 1976	Sep. 21, 1976
B 534,915	4,012,668	Mar. 23, 1976	Mar. 15, 1977
B 534,991	3,983,517	Jan. 27, 1976	Sep. 28, 1976
B 535,076	3,981,718	Jan. 20, 1976	Sep. 21, 1976
B 535,209	4,001,873	Mar. 16, 1976	Jan. 4, 1977
B 535,256	3,999,150	Mar. 23, 1976	Dec. 21, 1976
B 535,268	3,999,045	Mar. 30, 1976	Dec. 21, 1976
B 535,386	3,981,150	Jan. 13, 1976	Sep. 21, 1976
B 535,391	3,981,386	Jan. 27, 1976	Sep. 21, 1976
B 535,411	3,990,543	Feb. 24, 1976	Nov. 9, 1976
B 535,437	3,997,555	Feb. 24, 1976	Dec. 14, 1976
B 535,448	3,997,123	Mar. 16, 1976	Dec. 14, 1976
B 535,466	3,981,309	Jan. 27, 1976	Sep. 21, 1976
B 535,813	3,981,819	Jan. 27, 1976	Sep. 21, 1976
B 535,928	3,981,466	Jan. 13, 1976	Sep. 21, 1976
B 536,009	3,982,112	Jan. 27, 1976	Sep. 21, 1976
B 536,082	3,997,783	Mar. 16, 1976	Dec. 14, 1976
B 536,322	4,001,272	Mar. 23, 1976	Jan. 4, 1977
B 536,403	3,998,341	Mar. 23, 1976	Dec. 21, 1976
B 536,511	3,995,989	Mar. 9, 1976	Dec. 7, 1976
B 536,675	3,985,773	Jan. 20, 1976	Oct. 12, 1976
B 536,923	4,007,828	Mar. 30, 1976	Feb. 15, 1977
B 536,935	3,985,729	Jan. 13, 1976	Oct. 12, 1976
B 537,058	4,000,969	Mar. 23, 1976	Jan. 4, 1977
B 537,102	3,981,829	Jan. 13, 1976	Sep. 21, 1976
B 537,709	3,981,368	Jan. 13, 1976	Sep. 21, 1976
B 537,711	3,985,748	Jan. 13, 1976	Oct. 12, 1976
B 537,722	3,985,423	Feb. 3, 1976	Oct. 12, 1976
B 537,903	3,986,492	Jan. 20, 1976	Oct. 19, 1976
B 538,472	3,992,884	Feb. 3, 1976	Nov. 23, 1976
B 538,491	3,982,928	Feb. 17, 1976	Sep. 28, 1976
B 538,686	3,982,199	Jan. 13, 1976	Sep. 21, 1976
B 538,753	3,993,642	Feb. 10, 1976	Nov. 23, 1976
B 539,374	3,996,329	Mar. 9, 1976	Dec. 7, 1976
B 539,746	3,983,423	Feb. 17, 1976	Sep. 28, 1976
B 540,078	3,984,701	Jan. 13, 1976	Oct. 5, 1976
B 540,218	3,986,108	Feb. 10, 1976	Oct. 12, 1976
B 540,632	3,981,600	Jan. 13, 1976	Sep. 21, 1976
B 540,703	4,013,206	Apr. 13, 1976	Mar. 22, 1977
B 540,767	3,986,010	Mar. 16, 1976	Oct. 12, 1976
B 540,872	3,982,135	Jan. 20, 1976	Sep. 21, 1976
B 540,888	4,005,528	Mar. 30, 1976	Feb. 1, 1977
B 541,015	3,993,208	Jan. 27, 1976	Nov. 23, 1976
B 541,376	3,981,690	Feb. 17, 1976	Sep. 21, 1976
B 541,415	3,982,080	Feb. 3, 1976	Sep. 21, 1976
B 541,464	3,995,424	Feb. 17, 1976	Dec. 7, 1976
B 541,496	3,982,232	Jan. 27, 1976	Sep. 21, 1976
B 541,501	4,005,826	Apr. 13, 1976	Feb. 1, 1977
B 541,517	3,986,156	Jan. 13, 1976	Oct. 12, 1976
B 541,710	3,994,472	Feb. 24, 1976	Nov. 30, 1976
B 542,135	3,986,939	Feb. 10, 1976	Oct. 19, 1976
B 542,158	3,981,886	Jan. 13, 1976	Sep. 21, 1976
B 542,226	3,993,748	Feb. 24, 1976	Nov. 23, 1976
B 542,258	4,013,536	Mar. 23, 1976	Mar. 22, 1977
B 543,078	3,995,687	Feb. 17, 1976	Dec. 7, 1976
B 543,941	3,985,528	Jan. 13, 1976	Oct. 12, 1976
B 544,034	3,997,175	Feb. 17, 1976	Dec. 14, 1976
B 544,476	3,993,585	Feb. 24, 1976	Nov. 23, 1976
B 544,899	3,994,962	Feb. 17, 1976	Nov. 30, 1976
B 544,961	3,983,492	Jan. 13, 1976	Sep. 28, 1976
B 545,050	3,982,073	Jan. 20, 1976	Sep. 21, 1976
B 545,265	D 243,090	Apr. 13, 1976	Jan. 18, 1977
B 545,299	4,001,259	Feb. 24, 1976	Jan. 4, 1977
B 545,344	4,012,746	Mar. 30, 1976	Mar. 15, 1977
B 545,464	3,992,387	Feb. 10, 1976	Nov. 16, 1976
B 545,630	3,981,337	Jan. 27, 1976	Sep. 21, 1976
B 545,777	4,004,906	Jan. 27, 1976	Jan. 25, 1977
B 545,856	4,006,939	Mar. 30, 1976	Feb. 8, 1977
B 545,935	3,990,337	Jan. 27, 1976	Nov. 9, 1976
B 545,945	3,995,260	Jan. 27, 1976	Nov. 30, 1976
B 546,097	3,999,309	Mar. 23, 1976	Dec. 28, 1976
B 546,295	3,987,070	Jan. 20, 1976	Oct. 19, 1976
B 546,426	3,982,063	Jan. 27, 1976	Sep. 21, 1976
B 546,631	3,983,729	Feb. 3, 1976	Oct. 5, 1976
B 546,665	3,990,062	Jan. 20, 1976	Nov. 2, 1976
B 546,677	4,015,654	Apr. 6, 1976	Apr. 5, 1977
B 546,911	3,981,058	Jan. 13, 1976	Sep. 21, 1976
B 546,922	3,987,742	Mar. 16, 1976	Oct. 26, 1976
B 547,016	3,999,741	Mar. 23, 1976	Dec. 28, 1976
B 547,208	4,001,218	Feb. 24, 1976	Jan. 4, 1977
B 547,547	3,997,670	Feb. 24, 1976	Dec. 14, 1976
B 547,994	3,990,081	Jan. 20, 1976	Nov. 2, 1976
B 548,028	3,991,517	Feb. 3, 1976	Nov. 16, 1976
B 548,058	3,983,050	Feb. 17, 1976	Sep. 28, 1976
B 548,155	3,981,477	Jan. 13, 1976	Sep. 21, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,302	3,983,414	Feb. 17, 1976	Sep. 28, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,462	D 242,283	Feb. 10, 1976	Nov. 9, 1976
B 548,688	3,995,984	Mar. 9, 1976	Dec. 7, 1976
B 548,719	3,990,553	Feb. 17, 1976	Nov. 9, 1976
B 548,978	3,998,139	Mar. 9, 1976	Dec. 21, 1976
B 549,198	3,981,975	Jan. 13, 1976	Sep. 21, 1976
B 549,244	3,981,125	Jan. 27, 1976	Sep. 21, 1976
B 549,394	3,981,611	Jan. 27, 1976	Sep. 21, 1976
B 549,931	3,986,141	Jan. 20, 1976	Oct. 12, 1976
B 549,964	3,995,899	Feb. 24, 1976	Dec. 7, 1976
B 550,693	3,982,194	Jan. 20, 1976	Sep. 21, 1976
B 550,744	3,993,550	Feb. 17, 1976	Nov. 23, 1976
B 550,810	4,000,910	Mar. 23, 1976	Jan. 4, 1977
B 551,133	3,996,740	Mar. 2, 1976	Dec. 14, 1976
B 551,463	3,996,254	Feb. 17, 1976	Dec. 7, 1976
B 551,527	3,982,599	Jan. 13, 1976	Sep. 28, 1976
B 551,809	3,996,743	Feb. 24, 1976	Dec. 14, 1976
B 551,952	Re. 29,059	Mar. 2, 1976	Dec. 7, 1976
B 552,006	3,992,129	Feb. 3, 1976	Nov. 16, 1976
B 552,489	3,994,864	Feb. 10, 1976	Nov. 30, 1976
B 552,498	3,983,139	Jan. 13, 1976	Sep. 28, 1976
B 552,508	4,001,250	Mar. 16, 1976	Jan. 4, 1977
B 552,629	3,994,773	Mar. 23, 1976	Nov. 30, 1976
B 552,709	4,001,467	Mar. 23, 1976	Jan. 4, 1977
B 552,932	3,989,292	Feb 3, 1976	Nov. 2, 1976
B 553,421	4,001,146	Mar. 23, 1976	Jan. 4, 1977
B 553,460	3,990,019	Feb. 3, 1976	Nov. 2, 1976
B 553,584	3,992,456	Feb. 17, 1976	Nov. 16, 1976
B 553,629	3,999,242	Feb. 24, 1976	Dec. 28, 1976
B 554,039	3,999,944	Feb. 24, 1976	Dec. 28, 1976
B 554,164	4,001,465	Mar. 9, 1976	Jan. 4, 1977
B 554,283	3,981,152	Jan. 27, 1976	Sep. 21, 1976
B 554,291	4,001,209	Mar. 9, 1976	Jan. 4, 1977
B 554,380	4,001,147	Mar. 9, 1976	Jan. 4, 1977
B 554,594	3,985,960	Jan. 20, 1976	Oct. 12, 1976
B 554,655	4,015,048	Feb. 24, 1976	Mar. 29, 1977
B 554,848	4,001,265	Feb. 24, 1976	Jan. 4, 1977
B 554,939	3,994,013	Feb. 10, 1976	Nov. 23, 1976
B 555,146	4,007,636	Apr. 20, 1976	Feb. 15, 1977
B 555,437	3,991,152	Feb. 3, 1976	Nov. 9, 1976
B 555,456	3,993,423	Mar. 30, 1976	Nov. 23, 1976
B 555,772	3,982,641	Jan. 13, 1976	Sep. 28, 1976
B 556,057	3,985,349	Jan. 13, 1976	Oct. 12, 1976
B 556,496	3,990,244	Mar. 16, 1976	Nov. 9, 1976
B 556,897	3,992,972	Feb. 3, 1976	Nov. 23, 1976
B 557,153	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 557,274	4,016,375	Mar. 23, 1976	Apr. 5, 1977
B 557,299	3,990,357	Feb. 3, 1976	Nov. 9, 1976
B 557,621	3,990,800	Feb. 3, 1976	Nov. 9, 1976
B 557,721	4,013,435	Mar. 23, 1976	Mar. 22, 1977
B 557,856	3,991,019	Feb. 10, 1976	Nov. 9, 1976
B 558,220	3,990,009	Jan. 27, 1976	Nov. 2, 1976
B 558,251	3,981,289	Jan. 13, 1976	Sep. 21, 1976
B 558,813	3,989,188	Feb. 3, 1976	Nov. 2, 1976
B 558,818	3,983,762	Jan. 13, 1976	Oct. 5, 1976
B 558,819	3,990,160	Feb. 3, 1976	Nov. 9, 1976
B 558,973	3,981,126	Feb. 10, 1976	Sep. 21, 1976
B 559,111	3,984,854	Feb. 24, 1976	Oct. 5, 1976
B 559,142	4,001,124	Mar. 2, 1976	Jan. 4, 1977
B 559,394	4,016,094	Apr. 20, 1976	Apr. 5, 1977
B 559,441	4,013,609	Mar. 23, 1976	Mar. 22, 1977
B 559,631	4,011,406	Mar. 23, 1976	Mar. 8, 1977
B 559,697	3,995,770	Mar. 16, 1976	Dec. 7, 1976
B 559,700	4,001,189	Mar. 23, 1976	Jan. 4, 1977
B 559,701	4,001,190	Mar. 23, 1976	Jan. 4, 1977
B 559,737	3,984,668	Jan. 20, 1976	Oct. 5, 1976
B 559,954	3,982,673	Feb. 3, 1976	Sep. 28, 1976
B 560,261	3,987,493	Mar. 16, 1976	Oct. 19, 1976
B 560,488	3,989,940	Mar. 16, 1976	Nov. 2, 1976
B 560,717	3,982,034	Feb. 10, 1976	Sep. 21, 1976
B 560,765	3,983,389	Feb. 3, 1976	Sep. 28, 1976
B 561,062	D 242,248	Feb. 10, 1976	Nov. 9, 1976
B 561,165	4,013,002	Mar. 30, 1976	Mar. 22, 1977
B 561,166	4,011,809	Mar. 30, 1976	Mar. 15, 1977
B 561,365	4,005,078	Apr. 13, 1976	Jan. 25, 1977
B 561,387	3,985,706	Feb. 10, 1976	Oct. 12, 1976
B 561,405	4,003,770	Mar. 30, 1976	Jan. 18, 1977
B 561,712	3,992,126	Feb. 17, 1976	Nov. 16, 1976
B 561,732	3,991,460	Feb. 3, 1976	Nov. 16, 1976
B 561,764	3,984,634	Jan. 27, 1976	Oct. 5, 1976
B 561,770	4,000,366	Mar. 16, 1976	Dec. 28, 1976
B 561,784	3,984,710	Jan. 27, 1976	Oct. 5, 1976
B 562,413	4,000,930	Mar. 16, 1976	Jan. 4, 1977
B 562,462	3,985,836	Jan. 13, 1976	Oct. 12, 1976
B 562,519	4,013,125	Mar. 30, 1976	Mar. 22, 1977
B 562,601	3,998,360	Mar. 16, 1976	Dec. 21, 1976
B 562,698	3,983,972	Jan. 13, 1976	Oct. 5, 1976
B 562,813	3,985,491	Feb. 3, 1976	Oct. 12, 1976
B 563,070	3,996,230	Mar. 9, 1976	Dec. 7, 1976
B 563,165	4,000,977	Mar. 9, 1976	Jan. 4, 1977
B 563,244	3,983,562	Jan. 27, 1976	Sep. 28, 1976
B 563,301	3,995,589	Feb. 17, 1976	Dec. 7, 1976
B 563,412	3,992,127	Feb. 24, 1976	Nov. 16, 1976
B 563,419	3,999,051	Mar. 23, 1976	Dec. 21, 1976
B 563,722	3,990,925	Jan. 13, 1976	Nov. 9, 1976
B 563,780	3,987,769	Feb. 3, 1976	Oct. 26, 1976
B 563,932	4,000,638	Mar. 23, 1976	Jan. 4, 1977
B 564,252	4,001,293	Mar. 2, 1976	Jan. 4, 1977
B 564,255	4,015,996	Mar. 30, 1976	Apr. 5, 1977
B 564,314	3,984,996	Jan. 20, 1976	Oct. 12, 1976
B 564,902	4,001,351	Mar. 23, 1976	Jan. 4, 1977
B 565,180	3,981,685	Jan. 27, 1976	Sep. 21, 1976
B 565,275	3,990,299	Apr. 6, 1976	Nov. 9, 1976
B 565,717	3,999,138	Apr. 13, 1976	Dec. 21, 1976
B 565,754	4,011,626	Mar. 30, 1976	Mar. 15, 1977
B 566,464	3,996,367	Feb. 3, 1976	Dec. 7, 1976
B 566,556	3,998,511	Mar. 23, 1976	Dec. 21, 1976
B 566,572	3,988,590	Mar. 16, 1976	Oct. 26, 1976
B 566,585	4,001,083	Mar. 2, 1976	Jan. 4, 1977
B 567,058	3,985,188	Jan. 13, 1976	Oct. 12, 1976
B 567,076	4,011,187	Mar. 23, 1976	Mar. 8, 1977
B 567,158	3,988,073	Mar. 23, 1976	Oct. 26, 1976
B 567,207	3,991,689	Apr. 13, 1976	Nov. 16, 1976
B 567,435	3,995,724	Feb. 3, 1976	Dec. 7, 1976
B 567,854	3,985,038	Feb. 3, 1976	Oct. 12, 1976
B 567,892	4,000,855	Mar. 16, 1976	Jan. 4, 1977
B 568,226	3,992,698	Feb. 24, 1976	Nov. 16, 1976
B 568,770	3,982,213	Feb. 10, 1976	Sep. 21, 1976
B 569,125	3,986,980	Feb. 24, 1976	Oct. 19, 1976
B 569,293	4,004,149	Mar. 30, 1976	Jan. 18, 1977
B 569,501	3,999,250	Mar. 9, 1976	Dec. 28, 1976
B 569,519	3,993,133	Feb. 3, 1976	Nov. 23, 1976
B 569,646	3,985,222	Jan. 13, 1976	Oct. 12, 1976
B 569,859	3,994,160	Mar. 9, 1976	Nov. 30, 1976
B 570,172	3,987,763	Feb. 3, 1976	Oct. 26, 1976
B 570,615	3,998,570	Mar. 23, 1976	Dec. 21, 1976
B 570,862	3,991,639	Feb. 24, 1976	Nov. 16, 1976
B 570,925	4,040,802	Mar. 23, 1976	Aug. 9, 1977
B 571,219	3,991,388	Feb. 24, 1976	Nov. 9, 1976
B 571,638	4,001,244	Mar. 9, 1976	Jan. 4, 1977
B 571,659	3,995,186	Apr. 13, 1976	Nov. 30, 1976
B 572,642	3,990,715	Feb. 10, 1976	Nov. 9, 1976
B 572,726	4,015,020	Feb. 24, 1976	Mar. 29, 1977
B 573,033	3,995,224	Mar. 23, 1976	Nov. 30, 1976
B 573,114	4,014,843	Apr. 6, 1976	Mar. 29, 1977
B 573,991	4,013,704	Mar. 30, 1976	Mar. 22, 1977
B 573,994	4,000,641	Mar. 23, 1976	Jan. 4, 1977
B 574,128	3,982,961	Feb. 17, 1976	Sep. 28, 1976
B 574,616	4,000,424	Mar. 2, 1976	Dec. 28, 1976
B 574,996	3,989,718	Feb. 17, 1976	Nov. 2, 1976
B 575,583	4,000,928	Mar. 16, 1976	Jan. 4, 1977
B 575,757	3,981,170	Jan. 27, 1976	Sep. 21, 1976
B 575,761	4,013,123	Apr. 13, 1976	Mar. 22, 1977
B 575,776	4,013,124	Apr. 20, 1976	Mar. 22, 1977
B 575,851	3,985,826	Feb. 10, 1976	Oct. 12, 1976
B 576,385	4,009,498	Mar. 30, 1976	Mar. 1, 1977
B 576,859	3,991,526	Feb. 24, 1976	Nov. 16, 1976
B 576,903	3,995,032	Feb. 3, 1976	Nov. 30, 1976
B 578,447	3,982,658	Jan. 20, 1976	Sep. 28, 1976
B 579,104	3,982,081	Jan. 27, 1976	Sep. 21, 1976
B 579,116	3,986,227	Feb. 3, 1976	Oct. 19, 1976
B 579,153	4,013,745	Mar. 30, 1976	Mar. 22, 1977
B 579,806	3,995,318	Feb. 3, 1976	Nov. 30, 1976
B 580,379	4,000,796	Apr. 6, 1976	Jan. 4, 1977
B 580,826	3,988,391	Feb. 17, 1976	Oct. 26, 1976
B 580,921	3,984,054	Jan. 13, 1976	Oct. 5, 1976
B 581,564	4,036,653	Mar. 23, 1976	July 19, 1977
B 581,843	4,000,562	Mar. 16, 1976	Jan. 4, 1977
B 583,051	3,990,714	Feb. 3, 1976	Nov. 9, 1976
B 583,089	3,982,174	Jan. 27, 1976	Sep. 21, 1976
B 583,712	3,995,064	Feb. 10, 1976	Nov. 30, 1976
B 584,520	3,981,149	Jan. 27, 1976	Sep. 21, 1976
B 584,997	4,000,030	Mar. 9, 1976	Dec. 28, 1976
B 585,247	3,989,914	Feb. 3, 1976	Nov. 2, 1976
B 585,731	3,993,603	Feb. 3, 1976	Nov. 23, 1976
B 586,215	3,985,302	Jan. 20, 1976	Oct. 12, 1976
B 586,380	3,983,885	Mar. 2, 1976	Oct. 5, 1976
B 586,387	3,981,311	Feb. 3, 1976	Sep. 21, 1976
B 586,663	3,992,080	Feb. 3, 1976	Nov. 16, 1976
B 587,118	Re. 29,067	Mar. 2, 1976	Dec. 7, 1976
B 587,786	3,991,204	Feb. 17, 1976	Nov. 9, 1976
B 587,936	3,999,052	Mar. 23, 1976	Dec. 21, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 589,179	4,001,102	Mar. 23, 1976	Jan. 4, 1977	B 593,781	4,015,953	Mar. 16, 1976	Apr. 5, 1977
B 589,687	3,995,349	Mar. 23, 1976	Dec. 7, 1976	B 594,871	3,999,245	Mar. 16, 1976	Dec. 28, 1976
B 589,966	3,985,828	Feb. 17, 1976	Oct. 12, 1976	B 596,692	3,992,349	Feb. 17, 1976	Nov. 16, 1976
B 590,158	3,985,163	Feb. 10, 1976	Oct. 12, 1976	B 597,410	4,000,925	Mar. 30, 1976	Jan. 4, 1977
B 590,159	3,985,164	Feb. 3, 1976	Oct. 12, 1976	B 657,438	3,985,701	Jan. 20, 1976	Oct. 12, 1976
B 590,502	4,001,171	Mar. 23, 1976	Jan. 4, 1977	B 747,785	3,981,899	Feb. 10, 1976	Sep. 21, 1976
B 591,141	4,013,631	Mar. 23, 1976	Mar. 22, 1977	B 750,679	4,007,049	Mar. 23, 1976	Feb. 8, 1977
B 592,143	3,984,713	Jan. 27, 1976	Oct. 5, 1976	B 843,038	3,981,785	Feb. 3, 1976	Sep. 21, 1976
B 592,146	4,001,084	Mar. 2, 1976	Jan. 4, 1977	B 845,044	4,001,338	Mar. 30, 1976	Jan. 4, 1977
B 592,658	4,001,164	Mar. 23, 1976	Jan. 4, 1977	B 848,336	3,993,752	Mar. 30, 1976	Nov. 23, 1976

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 9TH DAY OF AUGUST, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Amplatz, Kurt. Method for forming and sterilizing catheters. Re. 29,343, Cl. 53-21.0FC.

Barbe, Guy, to Etudes et Fabrications Aeronautiques. Buckle for retarded automatic unlocking of safety belts and harnesses of parachuting equipment and of vehicles. Re. 29,342, Cl. 24-230.00A.

Ben-Porath, Moshe: *See*—
Zukerman, Yoram; Ben-Porath, Moshe; and Sabbah, Benjamin, Re. 29,351, Cl. 358-81.000.

Bott, John A. Spare tire extraction device. Re. 29,348, Cl. 224-42.120.

Elscint Ltd.: *See*—
Zukerman, Yoram; Ben-Porath, Moshe; and Sabbah, Benjamin, Re. 29,351, Cl. 358-81.000.

Erb, Robert A., to Franklin Institute, The. Method and apparatus for non-surgical, reversible sterilization of females. Re. 29,345, Cl. 128-1.00R.

Etudes et Fabrications Aeronautiques: *See*—
Barbe, Guy, Re. 29,342, Cl. 24-230.00A.

Franklin Institute, The: *See*—
Erb, Robert A., Re. 29,345, Cl. 128-1.00R.

Friedman, Louis T. Measuring and dispensing apparatus. Re. 29,347, Cl. 222-14.000.

Hasegawa, Hakumi: *See*—
Yamaguchi, Yoshihiro; Matsushita, Tomiharu; Noguchi, Masataka; Nakagawa, Junichi; and Hasegawa, Hakumi, Re. 29,344, Cl. 72-60.000.

Kobe Steel, Ltd.: *See*—
Yamaguchi, Yoshihiro; Matsushita, Tomiharu; Noguchi, Masataka; Nakagawa, Junichi; and Hasegawa, Hakumi, Re. 29,344, Cl. 72-60.000.

Kopp, Klaus F., to Vital Assists, Inc. Single needle dialysis. Re. 29,346, Cl. 128-214.00R.

Matsushita, Tomiharu: *See*—
Yamaguchi, Yoshihiro; Matsushita, Tomiharu; Noguchi, Masataka; Nakagawa, Junichi; and Hasegawa, Hakumi, Re. 29,344, Cl. 72-60.000.

Minnesota Mining and Manufacturing: *See*—
Strebel, Elwood L., Re. 29,349, Cl. 260-566.00F.

Nakagawa, Junichi: *See*—
Yamaguchi, Yoshihiro; Matsushita, Tomiharu; Noguchi, Masataka; Nakagawa, Junichi; and Hasegawa, Hakumi, Re. 29,344, Cl. 72-60.000.

Noguchi, Masataka: *See*—
Yamaguchi, Yoshihiro; Matsushita, Tomiharu; Noguchi, Masataka; Nakagawa, Junichi; and Hasegawa, Hakumi, Re. 29,344, Cl. 72-60.000.

Sabbah, Benjamin: *See*—
Zukerman, Yoram; Ben-Porath, Moshe; and Sabbah, Benjamin, Re. 29,351, Cl. 358-81.000.

Schoen, Lowhardt A. A., to Stamicarbon, B.V. Process for chlorinating ethylene polymers. Re. 29,350, Cl. 526-45.000.

Stamicarbon, B.V.: *See*—
Schoen, Lowhardt A. A., Re. 29,350, Cl. 526-45.000.

Strebel, Elwood L., to Minnesota Mining and Manufacturing. Organic thermotropic nematic compounds. Re. 29,349, Cl. 260-566.00F.

Vital Assists, Inc.: *See*—
Kopp, Klaus F., Re. 29,346, Cl. 128-214.00R.

Yamaguchi, Yoshihiro; Matsushita, Tomiharu; Noguchi, Masataka; Nakagawa, Junichi; and Hasegawa, Hakumi, to Kobe Steel, Ltd. Method and apparatus for manufacturing tubes or tubular bodies with inner walls having cross sections of irregular shapes. Re. 29,344, Cl. 72-60.000.

Zukerman, Yoram; Ben-Porath, Moshe; and Sabbah, Benjamin, to Elscint Ltd. Video-display-processor. Re. 29,351, Cl. 358-81.000.

LIST OF PLANT PATENTEES

McColley, Robert H. Distinct variety of Philodendron plant. 4,090, 8-9-77, Cl. 88.000.

LIST OF DESIGN PATENTEES

AAI Corporation: *See*—
Barr, Irwin R., 245,336, Cl. D25-21.000.
Barr, Irwin R., 245,337, Cl. D25-21.000.
Barr, Irwin R., 245,338, Cl. D25-21.000.
Barr, Irwin R., 245,339, Cl. D25-21.000.

Adams, Herbert L. Motor vehicle. 245,324, 8-9-77, Cl. D12-110.000.

Al Nyman & Son, Inc.: *See*—
Maeda, Hisashi; and Yoshikawa, Hironori, 245,370, Cl. D64-11.00B.

Alfredeen Production AB: *See*—
Berglund, Sture, 245,366, Cl. D15-143.000.

Baker, Clyde B. Mat for beverage containers. 245,308, 8-9-77, Cl. D7-188.000.

Barber, Jerry. Golf club wood head. 245,358, 8-9-77, Cl. D34-5.0GH.

Barnes, Richard R., Jr.: *See*—
Wodell, William Roy, 245,319, Cl. D9-246.000.

Barr, Irwin R., to AAI Corporation. Building structure. 245,336, 8-9-77, Cl. D25-21.000.

Barr, Irwin R., to AAI Corporation. Building structure. 245,337, 8-9-77, Cl. D25-21.000.

Barr, Irwin R., to AAI Corporation. Building structure. 245,338, 8-9-77, Cl. D25-21.000.

Barr, Irwin R., to AAI Corporation. Building structure. 245,339, 8-9-77, Cl. D25-21.000.

Beck, Paul. Wall mounted rack for beer cans or the like. 245,299, 8-9-77, Cl. D6-114.000.

Bennett, Brian Sidney, to Dunlop Limited. Tire for a vehicle wheel. 245,327, 8-9-77, Cl. D12-146.000.

Berglund, Sture, to Alfredeen Production AB. Bearing unit for mechanical measuring devices. 245,366, 8-9-77, Cl. D15-143.000.

Berkline Corporation, The: *See*—
Long, Stapleton, 245,296, Cl. D6-63.000.

Bidwell, Robert E.: *See*—
Kurtz, Leonard D.; and Bidwell, Robert E., 245,372, Cl. D24-59.000.

Bohan, Charles P., to Hercules Incorporated. Frame for a furniture arm. 245,304, 8-9-77, Cl. D6-195.000.

Brahm, Harry. Modular chair. 245,298, 8-9-77, Cl. D6-66.000.

Brandenfels, Carl, to H T Products, Inc. Portable kitchen island. 245,301, 8-9-77, Cl. D6-157.000.

Burgess, Kenneth Peter; and Elsdale, Timothy Sefton, to WCB Containers Limited. Combined play steps and slide. 245,356, 8-9-77, Cl. D34-5.00E.

Burgess, Kenneth Peter; and Elsdale, Timothy Sefton, to WCB Containers Limited. Sand or water play drum. 245,357, 8-9-77, Cl. D34-5.00F.

Casey, Everett Randolph. Perforator for cigar or cigarette. 245,347, 8-9-77, Cl. D27-51.000.

Center for Independent Living, Inc.: *See*—
Grippi, Vincent, Jr., 245,326, Cl. D12-131.000.

Chas. M. Freidheim Company: *See*—
Johnson, Donald O., 245,340, Cl. D25-92.000.

Chesebro, Robert E., Jr., to Wigwam Mills, Inc. Ski sock. 245,294, 8-9-77, Cl. D2-330.000.

Chuomusen Company, Ltd.: *See*—
Takeuchi, Reiji, 245,342, Cl. D14-43.000.

Cone, Richard E.: *See—*
Meeker, Paul K.; and Cone, Richard E., 245,335, Cl. D24-45.000.
Cruisaire Motor Corporation: *See—*
Davis, Joseph O.; Scott, Edward W.; and McCain, Lawrence G., 245,328, Cl. D12-155.000.
Curry, Joyce; and Pugh, Martha G. Combined blouse and panty hose ensemble. 245,291, 8-9-77, Cl. D2-29.000.
Curry, Joyce; and Pugh, Martha G. Combined blouse and panty hose ensemble. 245,292, 8-9-77, Cl. D2-29.000.
Curtin, James F. Combined bench and phonograph record storage chest. 245,297, 8-9-77, Cl. D6-64.000.
Data Packaging Corporation: *See—*
Lyman, George F., 245,305, Cl. D6-234.000.
Mathus, Gregory; Lyman, George; and Roche, David, 245,300, Cl. D6-130.000.
Davis, Joseph O.; Scott, Edward W.; and McCain, Lawrence G., to Cruisaire Motor Corporation. Automotive truck service module. 245,328, 8-9-77, Cl. D12-155.000.
Deknatel, Inc.: *See—*
Kurtz, Leonard D.; and Bidwell, Robert E., 245,372, Cl. D24-59.000.
Dempster Industries, Inc.: *See—*
Tangeman, Lawrence N., 245,331, Cl. D15-13.000.
Denski, Henry: *See—*
Ryden, Elihu Daniel; and Denski, Henry, 245,306, Cl. D7-161.000.
Dunlop Limited: *See—*
Bennett, Brian Sidney, 245,327, Cl. D12-146.000.
Elsdale, Timothy Sefton: *See—*
Burgess, Kenneth Peter; and Elsdale, Timothy Sefton, 245,356, Cl. D34-5.00E.
Burgess, Kenneth Peter; and Elsdale, Timothy Sefton, 245,357, Cl. D34-5.00F.
Equipto Electronics Corporation: *See—*
Gazarek, Kenneth F., 245,303, Cl. D6-177.000.
Fabri-Tek Incorporated: *See—*
Walstrom, Leslie Robert, 245,334, Cl. D24-17.000.
Fenice, Francis M. Doorknocker or similar article. 245,310, 8-9-77, Cl. D8-178.000.
Fisher, Arthur A. Cigarette snuffer. 245,344, 8-9-77, Cl. D27-09.000.
Fisher, James B., Jr. Bird feeder. 245,349, 8-9-77, Cl. D30-15.000.
Franck, Kurt, to Johns-Manville Corporation. Luminaire housing design. 245,367, 8-9-77, Cl. D48-20.00A.
Furuoka, Hideto, to Gakken Co., Ltd. Audio-visual sheet player. 245,369, 8-9-77, Cl. D14-20.000.
Gakken Co., Ltd.: *See—*
Furuoka, Hideto, 245,369, Cl. D14-20.000.
Galanthay, Phyllis Smith. Door knocker. 245,311, 8-9-77, Cl. D8-178.000.
Galeza, Theodore. Ring or similar article. 245,323, 8-9-77, Cl. D11-39.000.
Gazarek, Kenneth F., to Equipto Electronics Corporation. Electronic modular desk. 245,303, 8-9-77, Cl. D6-177.000.
Geary, Catherine P. Pet harness. 245,350, 8-9-77, Cl. D30-38.000.
Grippi, Vincent, Jr., to Center for Independent Living, Inc. Battery powered wheelchair. 245,326, 8-9-77, Cl. D12-131.000.
Guardino, Estelle Margaret. Button-supported tennis ball pocket. 245,295, 8-9-77, Cl. D2-400.000.
H T Products, Inc.: *See—*
Brandenfels, Carl, 245,301, Cl. D6-157.000.
Haapanen, Ann S. Doll. 245,353, 8-9-77, Cl. D34-4.00R.
Hanson Limited: *See—*
Mox, Dana W., 245,320, Cl. D10-40.000.
Harley Corporation: *See—*
Yavorsky, William M., 245,318, Cl. D9-170.000.
Harter Corporation: *See—*
Koepke, Earl H., 245,313, Cl. D8-375.000.
Haviland, John G. Pet house. 245,348, 8-9-77, Cl. D30-1.000.
Hercules Incorporated: *See—*
Bohan, Charles P., 245,304, Cl. D6-195.000.
Hycel, Inc.: *See—*
Moran, John J., 245,352, Cl. D24-1.100.
Hyde, Edward M.; and Kraynak, George A. Remembrance plaque. 245,351, 8-9-77, Cl. D31-13.000.
International Harvester Company: *See—*
Skyer, Robert A.; and McGirk, James R., 245,321, Cl. D10-102.000.
J. G. Redmond Associates, Inc. (Entire): *See—*
Pratt, Marion, 245,302, Cl. D6-177.000.
Johns-Manville Corporation: *See—*
Franck, Kurt, 245,367, Cl. D48-20.00A.
Johnson, Donald O., to Chas. M. Freidheim Company. Building block. 245,340, 8-9-77, Cl. D25-92.000.
Kahler, Richard W. Smoking pipe or similar article. 245,343, 8-9-77, Cl. D27-3.000.
Kitai, Isao, to Sharp Kabushiki Kaisha. Electronic calculating machine. 245,341, 8-9-77, Cl. D64-11.00B.
Koepke, Earl H., to Harter Corporation. Dual wheel caster. 245,313, 8-9-77, Cl. D8-375.000.
Kojima, Shizuka, to Tomy Kogyo Co., Inc. Water game case. 245,360, 8-9-77, Cl. D34-5.0JJ.
Kojima, Shizuka, to Tomy Kogyo Co., Inc. Water game case. 245,361, 8-9-77, Cl. D34-5.0JJ.
Kraynak, George A.: *See—*
Hyde, Edward M.; and Kraynak, George A., 245,351, Cl. D31-13.000.
Krome, Morris L. Sport show (bal pattern). 245,293, 8-9-77, Cl. D2-310.000.
Kurtz, Leonard D.; and Bidwell, Robert E., to Deknatel, Inc. Underwater drainage device with dual collection chambers. 245,372, 8-9-77, Cl. D24-59.000.
Kusan, Inc.: *See—*
McClary, Joseph M., 245,364, Cl. D34-15.0AC.
Lindquist, Robert J. Portable ultrasound generator unit. 245,325, 8-9-77, Cl. D10-116.000.
Long, Stapleton, to Berkline Corporation, The. Sofa. 245,296, 8-9-77, Cl. D6-63.000.
Lyman, George: *See—*
Mathus, Gregory; Lyman, George; and Roche, David, 245,300, Cl. D6-130.000.
Lyman, George F., to Data Packaging Corporation. Photograph display stand. 245,305, 8-9-77, Cl. D6-234.000.
MacArthur, Douglas E.: *See—*
Wodell, William Roy, 245,319, Cl. D9-246.000.
Maeda, Hisashi; and Yoshikawa, Hironori, to Al Nyman & Son, Inc. Calculating machine. 245,370, 8-9-77, Cl. D64-11.00B.
Mar-Lyn Imports, Inc.: *See—*
Patsiner, Leonard, 245,362, Cl. D34-11.00R.
Mathus, Gregory; Lyman, George; and Roche, David, to Data Packaging Corporation. Magnetic tape wall storage unit. 245,300, 8-9-77, Cl. D6-130.000.
McCain, Lawrence G.: *See—*
Davis, Joseph O.; Scott, Edward W.; and McCain, Lawrence G., 245,328, Cl. D12-155.000.
McClary, Joseph M., to Kusan, Inc. Toy refrigerator. 245,364, 8-9-77, Cl. D34-15.0AC.
McConnell, George Malcolm, to Pfizer Inc. Liquid dispenser. 245,316, 8-9-77, Cl. D9-131.000.
McGirk, James R.: *See—*
Skyer, Robert A.; and McGirk, James R., 245,321, Cl. D10-102.000.
Meeker, Paul K.; and Cone, Richard E. Orthodontic pacifier. 245,335, 8-9-77, Cl. D24-45.000.
MIRA-X S.A. Suhr: *See—*
Panton, Verner, 245,373, Cl. D92-1.00T.
Panton, Verner, 245,374, Cl. D92-1.00T.
Panton, Verner, 245,375, Cl. D92-1.00P.
Mitchell, Bernard A. Bottle. 245,314, 8-9-77, Cl. D9-107.000.
Mitchell, Bernard A. Combined bottle and cap. 245,315, 8-9-77, Cl. D9-107.000.
Mont, Howard, to Recoton Corporation. Record cleaner kit. 245,307, 8-9-77, Cl. D7-178.000.
Moran, John J., to Hycel, Inc. Multichannel automated apparatus for analysis of chemical samples. 245,352, 8-9-77, Cl. D24-1.100.
Mowry, William B. Key holder card. 245,371, 8-9-77, Cl. D87-8.000.
Mox, Dana W., to Hanson Limited. Kitchen timer or similar article. 245,320, 8-9-77, Cl. D10-40.000.
Mueller, Harry E. Lamp base. 245,368, 8-9-77, Cl. D48-20.00R.
Nitta, Tomio, to Tokai Seiki Co., Ltd. Cigarette gas lighter. 245,345, 8-9-77, Cl. D27-42.000.
Panton, Verner, to MIRA-X S.A. Suhr. Upholstery fabric or the like. 245,373, 8-9-77, Cl. D92-1.00T.
Panton, Verner, to MIRA-X S.A. Suhr. Upholstery fabric or the like. 245,374, 8-9-77, Cl. D92-1.00T.
Panton, Verner, to MIRA-X S.A. Suhr. Upholstery fabric or the like. 245,375, 8-9-77, Cl. D92-1.00P.
Pardo, John, to Procter & Gamble Company, The. Bottle. 245,317, 8-9-77, Cl. D9-156.000.
Patsiner, Leonard, to Mar-Lyn Imports, Inc. Savings bank or the like. 245,362, 8-9-77, Cl. D34-11.00R.
Pfizer Inc.: *See—*
McConnell, George Malcolm, 245,316, Cl. D9-131.000.
Porter, William V.; and Riordan, Maurice A. Pipe vent. 245,333, 8-9-77, Cl. D23-41.000.
Pratt, Marion, to J. G. Redmond Associates, Inc. (Entire). Table. 245,302, 8-9-77, Cl. D6-177.000.
Procter & Gamble Company, The: *See—*
Pardo, John, 245,317, Cl. D9-156.000.
Pugh, Martha G.: *See—*
Curry, Joyce; and Pugh, Martha G., 245,291, Cl. D2-29.000.
Curry, Joyce; and Pugh, Martha G., 245,292, Cl. D2-29.000.
Rasmussen, Carl M.: *See—*
Rasmussen, Reed; and Rasmussen, Carl M., 245,312, Cl. D8-356.000.
Rasmussen, Reed; and Rasmussen, Carl M. Camper tie down. 245,312, 8-9-77, Cl. D8-356.000.
Rauth, Richard P. Diver's tool. 245,309, 8-9-77, Cl. D8-16.000.
Recoton Corporation: *See—*
Mont, Howard, 245,307, Cl. D7-178.000.
Riordan, Maurice A.: *See—*
Porter, William V.; and Riordan, Maurice A., 245,333, Cl. D23-41.000.
Roche, David: *See—*
Mathus, Gregory; Lyman, George; and Roche, David, 245,300, Cl. D6-130.000.
Ryden, Elihu Daniel; and Denski, Henry. Portable golf ball washer case. 245,306, 8-9-77, Cl. D7-161.000.
Salles, Yvon, to U.S. Philips Corporation. Solar cell panel. 245,330, 8-9-77, Cl. D13-4.000.
Scott, Edward W.: *See—*
Davis, Joseph O.; Scott, Edward W.; and McCain, Lawrence G., 245,328, Cl. D12-155.000.
Shames, Harold: *See—*
Shames, Sidney J.; and Shames, Harold, 245,332, Cl. D23-35.000.
Shames, Sidney J.; and Shames, Harold. Spray head. 245,332, 8-9-77, Cl. D23-35.000.

Sharp Kabushiki Kaisha: *See*—
Kitai, Isao, 245,341, Cl. D64-11.00B.
Shirashi, Masami, to Tomy Kogyo Co., Inc. Toy bird. 245,365, 8-9-77, Cl. D34-15.00C.
Skyer, Robert A.; and McGirk, James R., to International Harvester Company. Instrument cluster. 245,321, 8-9-77, Cl. D10-102.000.
Takeuchi, Reiji, to Chuomusen Company, Ltd. Display device for a computer. 245,342, 8-9-77, Cl. D14-43.000.
Tangeman, Lawrence N., to Dempster Industries, Inc. High flotation vehicle for use in agricultural fertilizing or the like. 245,331, 8-9-77, Cl. D15-13.000.
Tokai Seiki Co., Ltd.: *See*—
Nitta, Tomio, 245,345, Cl. D27-42.000.
Tomy Kogyo Co., Inc.: *See*—
Kojima, Shizuka, 245,360, Cl. D34-5.0JJ.
Kojima, Shizuka, 245,361, Cl. D34-5.0JJ.
Shirashi, Masami, 245,365, Cl. D34-15.00C.
Yamagata, Arisuke, 245,354, Cl. D34-5.0CC.
Yamagata, Arisuke, 245,355, Cl. D34-5.0CC.
U.S. Philips Corporation: *See*—
Salles, Yvon, 245,330, Cl. D13-4.000.
Walstrom, Leslie Robert, to Fabri-Tek Incorporated. Impedance cardiograph enclosure. 245,334, 8-9-77, Cl. D24-17.000.
WCB Containers Limited: *See*—
Burgess, Kenneth Peter; and Elsdale, Timothy Sefton, 245,356, Cl. D34-5.00E.
Burgess, Kenneth Peter; and Elsdale, Timothy Sefton, 245,357, Cl. D34-5.00F.
White, Donald A. Fire alarm. 245,322, 8-9-77, Cl. D10-106.000.
Wichodil, George David. Balancing toy. 245,363, 8-9-77, Cl. D34-15.00N.
Wiegert, Gerald A. Bicycle fairing. 245,329, 8-9-77, Cl. D12-182.000.
Wigwam Mills, Inc.: *See*—
Chesebro, Robert E., Jr., 245,294, Cl. D2-330.000.
Wilke, William F. Table-type game apparatus. 245,359, 8-9-77, Cl. D34-5.00J.
Wodell, William Roy, to Barnes, Richard R., Jr.; and MacArthur, Douglas E. Shipping container. 245,319, 8-9-77, Cl. D9-246.000.
Yamagata, Arisuke, to Tomy Kogyo Co., Inc. Pocket racing game box. 245,354, 8-9-77, Cl. D34-5.0CC.
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Yavorsky, William M., to Harley Corporation. Drum. 245,318, 8-9-77, Cl. D9-170.000.
Yoshikawa, Hironori: *See*—
Maeda, Hisashi; and Yoshikawa, Hironori, 245,370, Cl. D64-11.00B.
Yoshinaga Prince Co., Ltd.: *See*—
Yoshinaga, Sadao, 245,346, Cl. D27-42.000.
Yoshinaga, Sadao, to Yoshinaga Prince Co., Ltd. Cigarette lighter. 245,346, 8-9-77, Cl. D27-42.000.

CLA
10
51
139
161 A
174
409

CLA
1.9
1.91

CLA
158

CLA
320

CLA
2.5 R
116 P
137

CLA
2 F
9
302
310 AA

CLAS
25

CLAS
42
209 B
236 R
250.19

CLAS
48 J
66
137

CLAS
81
159 R

CLAS
230 A
230 B

230 R

253 C
259.5
273 R
288 G
293 R

CLAS
86 A
108
205.13 R
221 K
230 A
277

CLAS
221
248
271
273

CLAS
96
123

156.8 H
159 R
239
420.5
423
432
458
460
564.4
571
577

580
599

CLASSIFICATION OF PATENTS

ISSUED AUGUST 9, 1977

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

10	4,040,123
51	4,040,124
139	4,040,125
161 A	4,040,126
174	4,040,127
409	4,040,128

CLASS 3

1.9	4,040,129
1.91	4,040,130
	4,040,131

CLASS 4

158	4,040,132

CLASS 5

320	4,040,133

CLASS 8

2.5 R	4,040,779
116 P	4,040,780
137	4,040,781

CLASS 9

2 F	4,040,134
9	4,040,135
302	4,040,136
310 AA	4,040,137

CLASS 13

25	4,041,236

CLASS 15

42	4,040,138
209 B	4,040,139
236 R	4,040,140
250.19	4,040,141

CLASS 16

48 J	4,040,143
66	4,040,144
137	4,040,142

CLASS 19

81	4,040,145
159 R	4,040,146

CLASS 23

230 A	4,040,789
230 B	4,040,784
	4,040,785
	4,040,787
230 R	4,040,786
	4,040,788
253 C	4,040,790
259.5	4,040,792
273 R	4,040,793
288 G	4,040,794
293 R	4,040,795

CLASS 24

86 A	4,040,147
108	4,040,148
205.13 R	4,040,150
221 K	4,040,151
230 A	Re.29,342
277	4,040,152

CLASS 28

221	4,040,153
248	4,040,155
271	4,040,782
273	4,040,154

CLASS 29

96	4,040,156
123	4,040,157
	4,040,158
156.8 H	4,040,159
159 R	4,040,160
239	4,040,161
420.5	4,040,162
423	4,040,163
432	4,040,164
458	4,040,165
460	4,040,166
564.4	4,040,167
571	4,040,168
577	4,040,169
	4,040,170
	4,040,171
580	4,040,172
599	4,040,173
603	4,040,174
623	4,040,175
624	4,040,176
630 C	4,040,177
745	4,040,178
749	4,040,179
753	4,040,180

CLASS 30

161	4,040,181
164.95	4,040,182
296 R	4,040,183
298	4,040,184
326	4,040,185

CLASS 32

14 D	4,040,188
66	4,040,186
	4,040,187

CLASS 33

304	4,040,189

CLASS 34

11	4,040,190

CLASS 35

1	4,040,191

CLASS 36

108	4,040,192

CLASS 40

28 C	4,040,193
142 A	4,040,194
341	4,040,195

CLASS 42

23	4,040,196

CLASS 43

15	4,040,197
19	4,040,198
43.14	4,040,199
57	4,040,200
57.5 A	4,040,202
90	4,040,201

CLASS 44

14	4,040,796
68	4,040,797
71	4,040,798
75	4,040,799

CLASS 46

2	4,040,204
51	4,040,205
138	4,040,206

CLASS 47

67	4,040,208
80	4,040,207

CLASS 48

85.2	4,040,800

CLASS 51

80 A	4,040,209

CLASS 52

2	4,040,210
100	4,040,211
115	4,040,217
145	4,040,212
	4,040,213
157	4,040,214
168	4,040,215
169.13	4,040,216
194	4,040,218
209	4,040,219
259	4,040,220
265	4,040,221
365	4,040,222
483	4,040,223
509	4,040,224
585	4,040,225
594	4,040,226
664	4,040,231
710	4,040,228
720	4,040,232
745	4,040,227

CLASS 53

21 FC	Re.29,343
21 R	4,040,233
24	4,040,230
29	4,040,229
38	4,040,234
59 R	4,040,235
67	4,040,236
180 M	4,040,237

CLASS 54

80	4,040,239

CLASS 55

16	4,040,801
71	4,040,802
73	4,040,803
158	4,040,804
	4,040,805
257 R	4,040,824

CLASS 56

167	4,040,238

CLASS 57

34 CP	4,040,240
35	4,040,241
58.89	4,040,243
77.3	4,040,242
77.45	4,040,244

CLASS 58

4 A	4,040,245
23 R	4,040,246
	4,040,247
38 R	4,040,248

CLASS 60

39.28 R	4,040,250
39.36	4,040,251
	4,040,252
39.51 H	4,040,249
303	4,040,253
420	4,040,254
445	4,040,255

CLASS 61

15	4,040,256
20	4,040,257
36 C	4,040,258
53.62	4,040,260
72.6	4,040,261
86	4,040,262
	4,040,263
	4,040,264
91	4,040,265

CLASS 62

28	4,040,806
37	4,040,259
121	4,040,266
180	4,040,267
335	4,040,268
374	4,040,269

CLASS 64

19	4,040,270
26	4,040,271
	4,040,272

CLASS 65

3 A	4,040,807
33	4,040,808
182 R	4,040,809

CLASS 66

19	4,040,273
57	4,040,274
64	4,040,275
107	4,040,276
154 A	4,040,277

CLASS 69

42	4,040,278

CLASS 70

34	4,040,279
333 R	4,040,280

CLASS 71

9	4,040,810
78	4,040,811
90	4,040,812
121	4,040,813

CLASS 72

10	4,040,281
41	4,040,282
60	Re.29,344
175	4,040,283
272	4,040,284
370	4,040,285
377	4,040,286
479	4,040,287

CLASS 73

15 B	4,040,288
46	4,040,289
71	4,040,290
81	4,040,291
84	4,040,292
117.3	4,040,294
211	4,040,293
228	4,040,295
281	4,040,296
398 AR	4,040,297
406	4,040,298
421.5 R	4,040,299
459	4,040,300

CLASS 74

3	4,040,301
37	4,040,302
61	4,040,303
230.17 T	4,040,304
242.15 R	4,040,305
334	4,040,306
425	4,040,307
586	4,040,308
665 T	4,040,309
688	4,040,310
750 R	4,040,311
801	4,040,312

CLASS 75

.5 B	4,040,815
.5 BC	4,040,814
35	4,040,816
42	4,040,817
58	4,040,818
60	4,040,819
68 R	4,040,820
134 S	4,040,821
140	4,040,822
203	4,040,823

CLASS 76

37	4,040,313
78 R	4,040,314

CLASS 82

2 E	4,040,315
32	4,040,316

CLASS 83

56	4,040,317
71	4,040,318
425.3	4,040,319
527	4,040,320

CLASS 84

1.15	4,040,321
183	4,040,335
282	4,040,322
422 S	4,040,323
478	4,040,324

CLASS 85

17	4,040,325
32 CS	4,040,326
46	4,040,327
	4,040,328

CLASS 86

20 C	4,040,329
	4,040,330

CLASS 89

1.804	4,040,334
14 C	4,040,331
37 F	4,040,332
37.5 R	4,040,333

CLASS 90

11 R	4,040,336

CLASS 91

491	4,040,337

CLASS 92

106	4,040,338
129	4,040,339

CLASS 93

49 R	4,040,340
77 FT	4,040,341

CLASS 96

1 LY	4,040,827
1.2	4,040,828
1.7	4,040,825
6	4,040,829
29 R	4,040,832
35.1	4,040,831
45.1	4,040,833
50 A	4,040,834
56.5	4,040,835
	4,040,836
60 BF	4,040,837
60 R	4,040,838
64	4,040,839
73	4,040,830
84 A	4,040,840
126	4,040,841

CLASS 99

323.1	4,040,342
421 H	4,040,343

CLASS 100

95	4,040,344

CLASS 101

66	4,040,345
336	4,040,346
349	4,040,347
350	4,040,348
365	4,040,349
376	4,040,350
382 MV	4,040,351
407 BP	4,040,352
426	4,040,353

CLASS 102

8	4,040,354
22 R	4,040,355
28 R	4,040,356
70.2 P	4,040,357
79	4,040,358
93	4,040,359

CLASS 105

136	4,040,360
	4,040,361
226	4,040,362
377	4,040,363

CLASS 106

1	4,040,842
15 FP	4,040,843
35	4,040,844
38.9	4,040,845
47 Q	4,040,846
69	4,040,847
73.5	4,040,848
	4,040,849
87	4,040,850
90	4,040,854
	4,040,855
93	4,040,851
97	4,040,852
103	4,040,853
170	4,040,856
243	4,040,857
288 B	4,040,858
291	4,040,859
302	4,040,860

CLASS 108

28	4,040,364

CLASS 109

50	4,040,365

CLASS 112

121.29	4,040,366
258	4,040,368
	4,040,369
273	4,040,367
299	4,040,370
420	4,040,371

CLASS 113

120 L	4 040,372

CLASS 114

126	4,040,373
144 C	4,040,374
160	4,040,375
221 A	4,040,376
230	4,040,377

CLASS 115

37	4,040,379
74	4,040,378

CLASS 116

34 R	4,040,380
86	4,040,381
124 L	4,040,382

CLASS 118

60	4,040,383
120	4,040,384
326	4,040,385
653	4,040,386
658	4,040,387

CLASS 119

1	4,040,388
52 R	4,040,389
86	4,040,390

CLASS 123

8.09	4,040,391
8.45	4,040,392
30 A	4,040,393
32 AE	4,040,397
32 EA	4,040,394
	4,040,395
32 JV	4,040,396
44 R	4,040,398
65 R	4,040,399
68	4,040,400
117 A	4,040,401
119 A	4,040,402
133	4,040,403
136	4,040,404
139 BG	4,040,405
146.5 A	4,040,406
	4,040,407
179 L	4,040,408

CLASS 125

11 AS	4,040,409

CLASS 126

270	4,040,410
271	4,040,411

CLASS 127

46 A	4,040,861
70	4,040,862

CLASS 128

1 R	Re.29,345
2.06 E	4,040,412
6	4,040,413
24 A	4,040,414
66	4,040,415
80 A	4,040,416
130	4,040,417
132 D	4,040,418
214 R	Re.29,346
215	4,040,419
218 M	4,040,420
218 N	4,040,421
223	4,040,422
287	4,040,423
290 R	4,040,424
303.14	4,040,425
303.17	4,040,426
348	4,040,427
351	4,040,428

CLASS 131

51	4,040,429
94	4,040,430
140 P	4,040,431

CLASS 132

9	4,040,432
89	4,040,433

CLASS 133

1 A	4,040,434

CLASS 134

3	4,040,863
6	4,040,864
7	4,040,865

26 4,040,866

CLASS 136

89 P 4,040,867

CLASS 137

1 4,040,436
102 4,040,437
106 4,040,438
115 4,040,439
375 4,040,440
519.5 4,040,441
543.17 4,040,442
546 4,040,443
561 A 4,040,444
596.18 4,040,445
625.17 4,040,446

CLASS 138

42 4,040,448
92 4,040,449
94 4,040,450
106 4,040,447

CLASS 139

48 4,040,451
302 4,040,452
446 4,040,453
448 4,040,454

CLASS 141

225 4,040,455
349 4,040,456
361 4,040,457
392 4,040,458

CLASS 144

312 4,040,459

CLASS 148

1.5 4,040,868
4,040,869
6.3 4,040,870
9.5 4,040,871
12 B 4,040,872
12 C 4,040,873
33.3 4,040,874
35 4,040,875
37 4,040,876
187 4,040,877
188 4,040,878

CLASS 149

18 4,040,879
76 4,040,880

CLASS 150

48 4,040,460
51 4,040,461

CLASS 151

14 CS 4,040,462
41.75 4,040,463

CLASS 152

361 R 4,040,464
381.1 4,040,465

CLASS 156

93 4,040,881
106 4,040,882
148 4,040,883
209 4,040,884
350 4,040,886
378 4,040,885
384 4,040,887
497 4,040,888
498 4,040,889
605 4,040,890
609 4,040,894
618 4,040,895
645 4,040,896
651 4,040,891
656 4,040,897
659 4,040,892
4,040,893

CLASS 159

27 R 4,040,898

CLASS 162

13 4,040,899
158 4,040,900
251 4,040,901

CLASS 164

17 4,040,466
49 4,040,467
55 4,040,468
56 4,040,469
58 4,040,470
92 4,040,471
154 4,040,472

CLASS 165

5 4,040,473
9 4,040,474
4,040,475
76 4,040,476
103 4,040,477
105 4,040,478
133 4,040,479

CLASS 166

57 4,040,480
214 4,040,481
255 4,040,482
272 4,040,483
294 4,040,484
297 4,040,485
311 4,040,486
314 4,040,487
317 4,040,488

CLASS 171

63 4,040,489
4,040,490

CLASS 172

269 4,040,491

CLASS 173

1 4,040,492

CLASS 174

36 4,041,237
48 4,041,238
151 4,041,240
153 G 4,041,241

CLASS 175

45 4,040,494
73 4,040,495
374 4,040,493

CLASS 176

30 4,040,902
39 4,040,903

CLASS 177

105 4,040,496

CLASS 178

68 4,041,239

CLASS 179

2 A 4,041,242
6.5 4,041,243
15 BT 4,041,244
18 AB 4,041,245
18 GF 4,041,246
81 R 4,041,247
84 VF 4,041,248
100.1 DR 4,041,249
100.11 4,041,250
107 FD 4,041,251
170 NC 4,041,252
175.2 R 4,041,253
175.3 R 4,041,254
4,041,255
182 R 4,041,256

CLASS 180

53 R 4,040,497
68 P 4,040,498
77 R 4,040,499
89.18 4,040,501
98 4,040,500
149 4,040,502

CLASS 181

192 4,040,503

CLASS 184

1 E 4,040,504
6.28 4,040,505

CLASS 188

72.5 4,040,506
112 4,040,507

CLASS 192

12 D 4,040,508
150 4,040,509

CLASS 194

2 4,040,510

CLASS 195

1.3 4,040,904
1.8 4,040,905
36 R 4,040,906
63 4,040,907
103.5 A 4,041,147
103.5 R 4,040,908
127 4,040,909

CLASS 197

133 R 4,040,511

CLASS 198

460 4,040,512
530 4,040,513
774 4,040,514

CLASS 200

1 R 4,041,257
6 A 4,041,258
46 4,041,259
50 A 4,041,260
144 B 4,041,261
4,041,262
148 A 4,041,263
148 R 4,041,264
159 R 4,041,265

CLASS 202

262 4,040,910

CLASS 203

9 4,040,911
4,040,912
69 4,040,913

CLASS 204

12 4,040,914
4,040,915
13 4,040,942
55 R 4,040,916
92 4,040,917
98 4,040,918
4,040,919
129.75 4,040,920
158 R 4,040,921
159.15 4,040,922
4,040,923
181 4,040,924
4,040,925
186 4,040,926
192 S 4,040,927
195 C 4,040,931
195 M 4,040,928
195 S 4,040,929
4,040,930
219 4,040,932
224 M 4,040,933
256 4,040,934
4,040,935
271 4,040,936
281 4,040,937
283 4,040,938
290 F 4,040,939
299 R 4,040,940

CLASS 206

.5 4,040,515
109 4,040,516
144 4,040,517
387 4,040,518

CLASS 208

8 4,040,941
80 4,040,943
89 4,040,944
113 4,040,945
131 4,040,946
235 4,040,947

CLASS 209

22 4,040,948
166 4,040,519
4,040,949
4,040,950
408 4,040,951

CLASS 210

6 4,040,953
42 R 4,040,954
44 4,040,955
60 4,040,956
73 R 4,040,957
4,040,958
78 4,040,959
96 R 4,040,960
195 R 4,040,961
206 4,040,962
219 4,040,963
238 4,040,964
297 4,040,965
400 4,040,952

CLASS 211

13 4,040,520
24 4,040,521
88 4,040,522

CLASS 213

46 R 4,040,523

CLASS 214

2.5 4,040,524
6 P 4,040,525
10.5 D 4,040,526
16.4 A 4,040,527
4,040,528
17 CB 4,040,529
35 R 4,040,530
77 R 4,040,531
152 4,040,532
310 4,040,533
766 4,040,534

CLASS 215

100.5 4,040,535

CLASS 219

10.55 B 4,041,267
10.55 E 4,041,266
69 E 4,041,269
69 G 4,041,268
73 R 4,041,270
86 4,041,271
89 4,041,272
121 EM 4,041,273
137 WM 4,041,274
307 4,041,275
308 4,041,276
386 4,041,277
411 4,041,278

CLASS 220

8 4,040,536
9 R 4,040,537
20 4,040,538
22 4,040,539
273 4,040,540
339 4,040,541

CLASS 221

162 4,040,542

CLASS 222

14 Re.29,347
473 4,040,543
477 4,040,544

CLASS 223

85 4,040,545
88 4,040,546

CLASS 224

5 H 4,040,547
25 A 4,040,548
29 G 4,040,549
42.12 Re.29,348
45 P 4,040,550
45 S 4,040,551

CLASS 225

1 4,040,552

CLASS 226

151 4,040,553

CLASS 227

8 4,040,554
67 4,040,555
120 4,040,556

CLASS 228

9 4,040,557

CLASS 229

23 BT 4,040,558
23 R 4,040,559
41 B 4,040,560
43 4,040,561
54 R 4,040,562

CLASS 235

61.7 B 4,041,279
92 CN 4,041,280
92 PD 4,041,281
98 R 4,041,282
150.2 4,041,283
150.27 4,041,285
150.5 4,041,284
151.11 4,041,287
4,041,294
151.3 4,041,286
151.31 4,041,288
151.32 4,041,293
151.33 4,041,289
156 4,041,290
4,041,291
4,041,295
164 4,041,292
4,041,296
4,041,297
193 4,041,298

CLASS 236

15 BC 4,040,563
49 4,040,564
91 G 4,040,565

CLASS 237

1 A 4,040,566
81 4,040,567

CLASS 239

57 4,040,568
467 4,040,569

CLASS 240

1.3 4,041,300
2.13 4,041,301
8.3 4,041,302
10.68 4,041,304
41.4 R 4,041,303
92 4,041,305
103 R 4,041,306

CLASS 241

3 4,040,570
30 4,040,571

CLASS 242

18 A 4,040,572
35.5 A 4,040,573
56 A 4,040,574
76 4,040,575
107.4 A 4,040,576

CLASS 244

4 A 4,040,577
17.19 4,040,578
78 4,040,580
83 K 4,040,581
103 S 4,040,582
113 4,040,583
214 4,040,579

CLASS 248

2 4,040,584
11 4,040,585
14 4,040,586
185 4,040,587
245 4,040,588
300 4,040,589
358 AA 4,040,590
394 4,040,591
460 4,040,592
489 4,040,593
493 4,040,149

CLASS 249

27 4,040,594
68 4,040,595
117 4,040,596
134 4,040,597
176 4,040,598

CLASS 250

203 R 4,041,307
226 4,041,308
262 4,041,309
302 4,041,310
311 4,041,311
315 R 4,041,312
341 4,041,313
352 4,041,314
360 4,041,315
396 R 4,041,316
432 PD 4,041,317
459 4,041,318
460 4,041,319
523 4,041,320
560 4,041,321
568 4,041,322

CLASS 251

28 4,040,599
63 4,040,600

CLASS 252

8.55 R 4,040,967
8.8 4,040,966
51.5 A 4,040,968
62.1 L 4,040,970
62.1 R 4,040,969
62.54 4,040,971
179 4,040,972
301.1 W 4,040,973
316 4,040,974
359 E 4,040,975
373 4,040,976
401 4,040,977
437 4,040,978
439 4,040,979
463 4,040,980
4,040,981
466 J 4,040,982
469 4,040,983
500 4,040,984
501 4,040,985
522 4,040,986
4,040,987
532 4,040,988
548 4,040,989

CLASS 254

133 R 4,040,601
164 4,040,602

CLASS 256

8 4,040,603
10 4,040,604

CLASS 259

64 4,040,605
107 4,040,606
192 4,040,607

CLASS 260

2.1 R 4,040,990
2.5 AW 4,040,992
2.5 BD 4,040,991
18 EP 4,040,993
18 PF 4,040,994
22 CQ 4,040,995
23 XA 4,040,996
4,040,997
29.2 M 4,040,998
29.3 4,040,999
29.6 B 4,041,000
29.6 WA 4,041,001
30.6 R 4,041,002
30.8 R 4,041,003
32.8 A 4,041,005
32.8 EP 4,041,004
33.6 UA 4,041,006
37 EP 4,041,007
40 R 4,041,008
42.18 4,041,009
42.26 4,041,010
45.75 R 4,041,013
4,041,015
45.75 S 4,041,014
45.8 A 4,041,012
45.8 NT 4,041,011
45.85 E 4,041,016
47 CZ 4,041,065
47 UA 4,041,017
75 NC 4,041,019
75 R 4,041,018
79.3 M 4,041,020
112 B 4,041,021
112.5 R 4,041,023
112.5 T 4,041,022
158 4,041,024
4,041,025
239.3 D 4,041,026
250 A 4,041,033
250 BN 4,041,032
250 P 4,041,034
251 R 4,041,035
256.4 C 4,041,037
256.4 F 4,041,036
268 C 4,041,038
290 R 4,041,039
292 4,041,040
293.86 4,041,041
301 4,041,042
306.6 A 4,041,043
308 B 4,041,044
332.1 4,041,047
333 4,041,048
343.5 4,041,049
345.7 4,041,050
373 4,041,051
380 4,041,052
381 4,041,053
393 4,041,054
397.3 4,041,055
404.5 4,041,056
410.9 R 4,041,057
4,041,058
424 4,041,059
429.7 4,041,060
464 4,041,061
465 D 4,041,062
465.4 4,041,063
468 D 4,041,066
485 R 4,041,067
4,041,068
486 R 4,041,069
553 A 4,041,070
556 AR 4,041,073
4,041,074
558 A 4,041,072
558 P 4,041,075
558 R 4,041,071
559 A 4,041,076
562 R 4,041,077
566 F Re.29,349
570 D 4,041,078
574 4,041,079
585 B 4,041,080
601 R 4,041,081
604 HF 4,041,082
617 C 4,041,083
617 F 4,041,084
621 R 4,041,085
648 F 4,041,086
652 R 4,041,087
668 A 4,041,089
668 B 4,041,088
671 R 4,041,090
672 T 4,041,091
673.5 4,041,092
4,041,093
676 R 4,041,094
4,041,095
4,041,096
4,041,097
683.15 D 4,041,098
683.3 4,041,099
683.47 4,041,100
683.51 4,041,101
683.62 4,041,102
857 D 4,041,103
859 R 4,041,104
4,041,105
876 R 4,041,106
4,041,107
881 4,041,108
927 R 4,041,109

938 4,041,110
954 4,041,111

CLASS 261

72 R 4,041,112
98 4,041,113

CLASS 264

1 4,041,114
5 4,041,115
29.5 4,041,116
60 4,041,195
63 4,041,117
71 4,041,118
75 4,041,119
171 4,041,120
191 4,041,121
250 4,041,031
277 4,041,122
332 4,041,123
336 4,041,124

CLASS 266

44 4,040,608
143 4,040,609
235 4,040,610
243 4,040,611
268 4,040,612

CLASS 269

247 4,040,613

CLASS 271

19 4,040,614
63 4,040,615
65 4,040,616
177 4,040,617
182 4,040,618

CLASS 272

68 4,040,619
133 4,040,627
137 4,040,620

CLASS 273

85 C 4,040,621
86 R 4,040,622
98 4,040,623
102 AP 4,040,624
104 4,040,625
123 R 4,040,626
134 B 4,040,628
135 C 4,040,629
157 R 4,040,630
186 A 4,040,631
189 A 4,040,632
191 A 4,040,633

CLASS 274

2 4,040,634
37 4,040,635

CLASS 277

188 A 4,040,636
224 4,040,637

CLASS 280

9 4,040,638
87.04 A 4,040,639
106 R 4,040,640
507 4,040,641
654 4,040,642
656 4,040,643
659 4,040,644
745 4,040,645
750 4,040,646
766 4,040,647

CLASS 282

27.5 4,040,648

CLASS 285

3 4,040,649
18 4,040,650
113 4,040,651

CLASS 292

167 4,040,652
202 4,040,653

CLASS 296

57 R 4,040,654
63 4,040,655
91 4,040,656
97 R 4,040,657

CLASS 297

159 4,040,658
194 4,040,659
284 4,040,661
361 4,040,663
389 4,040,660
4,040,664
417 4,040,665
445 4,040,662

CLASS 299

1 4,040,666
8 4,040,667
39 4,040,668
56 4,040,669

CLASS 301

5.3 4,040,670
58 4,040,671
108 A 4,040,672

CLASS 303

6 C 4,040,673
22 R 4,040,674
89 4,040,675
92 4,040,676
95 4,040,677

CLASS 307

88.3 4,041,323
91 4,041,324
141 4,041,325
216 4,041,326
231 4,041,327
247 A 4,041,329
251 4,041,330
252 J 4,041,332
252 Q 4,041,331
279 4,041,333
293 4,041,334
351 4,041,328

CLASS 308

6 C 4,040,679
6 R 4,040,678
8.2 4,040,680
10 4,040,681
176 4,040,682
187.1 4,040,683
4,040,684
189 R 4,040,685
201 4,040,686
4,040,687
202 4,040,688
205 4,040,689
237 R 4,040,690

CLASS 310

49 R 4,041,336
178 4,041,337
186 4,041,338
239 4,041,339
263 4,041,340
321 4,041,335

CLASS 312

31 4,040,691
194 4,040,692
236 4,040,693
263 4,040,694
320 4,040,695

CLASS 313

105 R 4,041,342
4,041,343
113 4,041,344
225 4,041,345
336 4,041,346
450 4,041,347
497 4,041,348

CLASS 315

3.5 4,041,349
39.75 4,041,350
205 4,041,351
248 4,041,352
267 4,041,353
371 4,041,354
411 4,041,355

CLASS 318

221 R 4,041,360
227 4,041,361
318 4,041,362

CLASS 320

15 4,041,363

CLASS 322

47 4,041,368
99 4,041,369

CLASS 323

8 4,041,370
94 H 4,041,371

CLASS 324

9 4,041,372
15 4,041,373
20 CR 4,041,374
32 4,041,375
33 4,041,376
34 MA 4,041,377
34 TK 4,041,378
37 4,041,379
51 4,041,380
52 4,041,381
65 R 4,041,382
66 4,041,383
71 CP 4,041,385
73 PC 4,041,384
77 R 4,041,386
78 R 4,041,387
158 T 4,041,388

CLASS 325

3 4,041,389
21 4,041,390
30 4,041,391
38 A 4,041,392
54 4,041,393
102 4,041,394
133 4,041,395
150 4,041,396
304 4,041,397
308 4,041,398
357 4,041,399
392 4,041,400
455 4,041,401
465 4,041,402

CLASS 328

39 4,041,403
150 4,041,404
181 4,041,405

CLASS 329

107 4,041,406

CLASS 330

13 4,041,407
15 4,041,408
29 4,041,409
43 4,041,413
129 4,041,410
207 A 4,041,411

CLASS 331

10 4,041,412
55 4,040,728
94.5 G 4,041,414
94.5 PE 4,041,415
96 4,041,416
107 R 4,041,417

CLASS 333

18 4,041,418
30 R 4,041,419
35 4,041,420
73 W 4,041,421

CLASS 334

49 4,041,422

CLASS 335

20 4,041,423
75 4,041,424
129 4,041,425
131 4,041,426
205 4,041,427
210 4,041,428
276 4,041,429

CLASS 336

92 4,041,430
160 4,041,431

CLASS 337

111 4,041,432
112 4,041,433
159 4,041,435
204 4,041,434
295 4,041,525

CLASS 338

21 4,041,436
35 4,041,437
78 4,041,439
195 4,041,440
237 4,041,438

CLASS 339

8 R 4,040,696
61 R 4,040,697
75 P 4,040,698
91 R 4,040,699
95 R 4,040,700
97 R 4,040,702
99 R 4,040,701
4,040,703
4,040,704
4,040,705
103 R 4,040,706
111 4,040,707
4,040,708
125 L 4,040,709
154 A 4,040,710
198 R 4,040,711
255 R 4,040,712
259 R 4,040,713
264 R 4,040,714
272 A 4,040,715

CLASS 340

3 R 4,041,441
6 R 4,041,442
15.5 AF 4,041,443
15.5 TS 4,041,444
4,041,445
17 R 4,041,446
32 4,041,448
52 C 4,041,449
64 4,041,450
79 4,041,451
134 4,041,452
146.1 BE 4,041,453
146.1 C 4,041,455
146.3 F 4,041,454
146.3 R 4,041,456
147 MD 4,041,457
166 R 4,041,458
4,041,459
173 CC 4,041,476
173 LS 4,041,475
173 R 4,041,474
173.2 4,041,477
174 TF 4,041,447
4,041,478
237 S 4,041,479
280 4,041,480
324 AD 4,041,482
324 M 4,041,481
347 NT 4,041,484
347 P 4,041,483

CLASS 343

5 R 4,041,341
7.3 4,041,485
4,041,486
7.5 4,041,487
8 4,041,488
17.1 R 4,041,489
17.7 4,041,490
100 R 4,041,491
106 R 4,041,492
4,041,493
112 D 4,041,494
112 R 4,041,495
113 DE 4,041,496
702 4,041,497
749 4,041,498
756 4,041,499
761 4,041,500
844 4,041,501

CLASS 346

33 A 4,041,502
83 4,041,503

CLASS 350

4 4,040,716
127 4,040,717
147 4,040,718
160 LC 4,040,719
4,040,720
4,040,721
161 W 4,040,722
203 4,040,723
239 4,040,724
263 4,040,725
288 4,040,726
4,040,727

CLASS 351

137 4,040,729

CLASS 352

192 4,040,730

CLASS 354

23 R 4,041,504
25 4,041,505
51 4,041,506
64 4,041,507
128 4,041,508
152 4,041,509
217 4,041,510
232 4,041,511
234 4,041,512
241 4,041,513
288 4,041,514

CLASS 355

3 R 4,040,731
4,040,732
8 4,040,733
10 4,040,735
43 4,040,736
49 4,040,737

CLASS 356

1 4,040,738
4 4,040,739
4,040,740
28 4,040,741
39 4,040,742
73 4,040,743
152 4,040,744
167 4,040,745
168 4,040,746
188 4,040,747
199 4,040,748
201 4,040,749
212 4,040,750
225 4,040,751
249 4,040,752

CLASS 357

13 4,041,515
17 4,041,516
22 4,041,517
23 4,041,518
24 4,041,520
4,041,521
30 4,041,519
42 4,041,522
72 4,041,523
81 4,041,524

CLASS 358

4 4,041,526
22 4,041,527
37 4,041,531
47 4,041,528
81 Re.29,351
109 4,041,529
128 4,041,530
4,041,532
160 4,041,533
186 4,041,534
191 4,041,535
213 4,041,536

CLASS 360

60 4,041,537
67 4,041,538
106 4,041,539

CLASS 361

6 4,041,357
14 4,041,356
24 4,041,540
27 4,041,541
4,041,542
33 4,041,543
106 4,041,544
120 4,041,545
152 4,041,546
365 4,041,358
396 4,041,548
410 4,041,547
433 4,041,359

CLASS 363

15 4,041,364
58 4,041,365
61 4,041,366
97 4,041,367

CLASS 364

200 4,041,461
4,041,462
4,041,464
4,041,471
841 4,041,299
900 4,041,460
4,041,463
4,041,465
4,041,466
4,041,467
4,041,468
4,041,469
4,041,470
4,041,472
4,041,473

CLASS 401

186 4,040,753

CLASS 403

16 4,040,754
205 4,040,755
307 4,040,756
356 4,040,757
397 4,040,758

CLASS 404

6 4,040,759
14 4,040,760
86 4,040,761
129 4,040,762

CLASS 408

1 R 4,040,763
59 4,040,764
239 A 4,040,765

CLASS 415

9 4,040,766
115 4,040,767

CLASS 416

122 4,040,768
213 A 4,040,769
230 4,040,770

CLASS 417

62 4,040,771
364 4,040,772
424 4,040,773

CLASS 423

21 4,041,125
22 4,041,126
92 4,041,127
213.2 4,041,128
220 4,041,130
234 4,041,129
242 4,041,131
279 4,041,132
305 4,041,133
321 S 4,041,134
329 4,041,135
347 4,041,136
464 4,041,138
489 4,041,137
508 4,041,139
561 R 4,041,140
571 4,041,141
573 G 4,041,142
598 4,041,143
618 4,041,144

CLASS 424

1 4,041,145
4,041,146
45 4,041,148
57 4,041,149
71 4,041,150
78 4,041,151
85 4,041,152
131 4,041,153
150 4,041,154
177 4,041,155
4,041,156
200 4,041,157
212 4,041,158
228 4,041,159
229 4,041,160
246 4,041,161
4,041,162
251 4,041,163
263 4,041,164
267 4,041,165
4,041,166
270 4,041,167
273 4,041,168
274 4,041,169
277 4,041,170
301 4,041,171
304 4,041,172
308 4,041,173
310 4,041,174
311 4,041,175
318 4,041,176
322 4,041,177
329 4,041,178

CLASS 425

65 4,040,774
111 4,040,775
145 4,040,776
218 4,040,734

CLASS 426

3 4,041,179
11 4,041,180
55 4,041,181
59 4,041,182
105 4,041,183
321 4,041,184
534 4,041,185
535 4,041,186
598 4,041,187
607 4,041,188
656 4,041,189

CLASS 427

43 4,041,190
4,041,191
4,041,192
151 4,041,193
226 4,041,194
252 4,041,196
278 4,041,197
294 4,041,198

CLASS 428

36 4,041,199
40 4,041,200
4,041,201
138 4,041,202
157 4,041,203
199 4,041,204
220 4,041,205
409 4,041,206
413 4,041,235
421 4,041,207
424 4,041,208
500 4,041,209

CLASS 429

14 4,040,435
16 4,041,210
36 4,041,211
89 4,041,212
98 4,041,213
4,041,214
104 4,041,215
4,041,216
112 4,041,217

CLASSIFICATION OF PATENTS

136	4,041,218		CLASS 432	45	Re.29,350	278	4,041,230		CLASS 542	117	4,041,030
144	4,041,219	124	4,040,203	96	4,041,224	317	4,041,231	400	4,041,027		CLASS 548
191	4,041,220	192	4,040,778		4,041,225		CLASS 536		CLASS 544	302	4,041,045
206	4,041,221		CLASS 526	144	4,041,226					375	4,041,046
	CLASS 431			190	4,041,227	17	4,041,232				CLASS 560
		6	4,041,222	240	4,041,228	56	4,041,233	12	4,041,028		
95 A	4,040,777	10	4,041,223	249	4,041,229	114	4,041,234	25	4,041,029	121	4,041,064

CLASSIFICATION OF DESIGNS

D2—	29	245,291	D7—	161	245,306	D10—	40	245,320		143	245,366		42	245,345		5 JJ	245,360
		245,292		178	245,307		102	245,321	D23—	35	245,332			245,346			245,361
	310	245,293		188	245,308		106	245,322		41	245,333		51	245,347		11 R	245,362
	330	245,294	D8—	16	245,309		116	245,325	D24—	1.1	245,352	D30—	1	245,348		15 AC	245,364
	400	245,295		178	245,310	D11—	39	245,323		17	245,334		15	245,349		15 C	245,365
D6—	63	245,296			245,311	D12—	110	245,324		45	245,335		38	245,350		15 N	245,363
	64	245,297		356	245,312		131	245,326		59	245,372	D31—	13	245,351	D48—	20 A	245,367
	66	245,298		375	245,313		146	245,327	D25—	21	245,336	D34—	4 R	245,353		20 R	245,368
	114	245,299	D9—	107	245,314		155	245,328			245,337		5 CC	245,354	D64—	11 B	245,341
	130	245,300			245,315		182	245,329			245,338			245,355			245,370
	157	245,301		131	245,316	D13—	4	245,330			245,339		5 E	245,356	D87—	8	245,371
	177	245,302		156	245,317	D14—	20	245,369		92	245,340		5 F	245,357	D92—	1 P	245,375
		245,303		170	245,318		43	245,342	D27—	3	245,343		5 GH	245,358		1 T	245,373
	195	245,304		246	245,319	D15—	13	245,331		09	245,344		5 J	245,359			245,374
	234	245,305															

CLASSIFICATION OF PLANTS

P.—	88	4,090									

GEOGRAPHICAL INDEX
OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

1 :	4,040,208	4,040,518	4,041,132	4,040,774	4,040,497		4,040,995
	4,040,425	4,040,520	4,041,133	4,040,788	17 : 4,040,124		4,041,016
	4,040,459	4,040,532	4,041,159	4,040,847	4,040,143		4,041,043
	4,040,479	4,040,543	4,041,173	4,041,126	4,040,144		4,041,050
	4,040,577	4,040,545	4,041,174	4,041,429	4,040,175		4,041,065
	4,040,750	4,040,560	4,041,182	9 : 4,040,247	4,040,176		4,041,089
	4,040,875	4,040,562	4,041,209	4,040,346	4,040,186		4,041,092
	4,040,896	4,040,575	4,041,233	4,040,542	4,040,204		4,041,101
4 :	4,040,422	4,040,581	4,041,240	4,040,568	4,040,205		4,041,131
	4,040,548	4,040,587	4,041,284	4,040,603	4,040,213		4,041,150
	4,040,695	4,040,588	4,041,288	4,040,661	4,040,232		4,041,187
	4,040,845	4,040,601	4,041,306	4,040,687	4,040,287		4,041,224
	4,040,940	4,040,623	4,041,310	4,040,767	4,040,308		4,041,225
	4,040,950	4,040,625	4,041,313	4,040,835	4,040,350		4,041,247
	4,041,267	4,040,627	4,041,326	4,040,837	4,040,351		4,041,248
	4,041,292	4,040,633	4,041,330	4,040,883	4,040,360		4,041,266
	4,041,407	4,040,639	4,041,331	4,040,884	4,040,361		4,041,318
	4,041,412	4,040,642	4,041,333	4,040,962	4,040,362		4,041,338
	4,041,520	4,040,656	4,041,353	4,040,980	4,040,379		4,041,360
5 :	4,040,526	4,040,664	4,041,357	4,041,098	4,040,418		4,041,365
6 :	4,040,132	4,040,670	4,041,386	4,041,105	4,040,427		4,041,368
	4,040,133	4,040,671	4,041,387	4,041,118	4,040,433		4,041,390
	4,040,135	4,040,678	4,041,389	4,041,124	4,040,451		4,041,396
	4,040,151	4,040,698	4,041,397	4,041,163	4,040,468		4,041,400
	4,040,164	4,040,702	4,041,398	4,041,210	4,040,491		4,041,425
	4,040,169	4,040,720	4,041,413	4,041,242	4,040,499		4,041,430
	4,040,184	4,040,722	4,041,415	06 : 4,041,343	4,040,505		4,041,448
	4,040,194	4,040,727	4,041,421	10 : 4,040,538	4,040,510		4,041,505
	4,040,197	4,040,730	4,041,426	4,040,626	4,040,512		4,041,535
	4,040,199	4,040,734	4,041,439	4,041,086	4,040,537		4,041,538
	4,040,211	4,040,736	4,041,441	4,041,115	4,040,539	18 :	4,040,228
	4,040,234	4,040,738	4,041,446	4,041,121	4,040,540		4,040,306
	4,040,257	4,040,744	4,041,452	11 : 4,040,932	4,040,613		4,040,309
	4,040,311	4,040,745	4,041,456	12 : 4,040,123	4,040,621		4,040,312
	4,040,321	4,040,748	4,041,463	4,040,127	4,040,629		4,040,338
	4,040,333	4,040,768	4,041,467	4,040,141	4,040,658		4,040,358
	4,040,335	4,040,775	4,041,469	4,040,161	4,040,693		4,040,365
	4,040,342	4,040,782	4,041,471	4,040,192	4,040,712		4,040,477
	4,040,343	4,040,784	4,041,472	4,040,224	4,040,724		4,040,513
	4,040,345	4,040,796	4,041,476	4,040,252	4,040,769		4,040,528
	4,040,395	4,040,797	4,041,484	4,040,377	4,040,773		4,040,550
	4,040,403	4,040,819	4,041,486	4,040,461	4,040,794		4,040,563
	4,040,411	4,040,870	4,041,487	4,040,585	4,040,812		4,040,665
	4,040,412	4,040,880	4,041,490	4,040,593	4,040,872		4,040,787
	4,040,420	4,040,897	4,041,516	4,040,602	4,040,909		4,040,881
	4,040,423	4,040,902	4,041,519	4,040,624	4,040,921		4,040,982
	4,040,436	4,040,907	4,041,527	4,040,709	4,040,929		4,041,111
	4,040,447	4,040,944	4,041,529	4,040,710	4,040,930		4,041,369
	4,040,462	4,040,964	8 : 4,040,181	4,040,813	4,040,943		4,041,440
	4,040,480	4,041,000	4,040,210	4,041,410	4,040,947		4,041,539
	4,040,500	4,041,027	4,040,258	4,041,424	4,040,966	19 :	4,040,214
	4,040,511	4,041,034	4,040,426	4,041,462	4,040,979		4,040,249
	4,040,516	4,041,130	4,040,763	13 : 4,040,334	4,040,994		4,040,261

4,040,332
4,040,531
4,040,534
4,040,641
4,041,311
4,041,423
4,041,483
20 : 4,040,140
4,040,166
4,040,238
4,040,547
4,040,643
4,040,753
4,040,824
4,041,546
21 : 4,040,207
4,040,961
22 : 4,040,231
4,040,243
4,040,299
4,040,314
4,040,424
4,040,481
4,040,521
4,040,524
4,040,558
4,040,792
4,040,805
4,041,100
23 : 4,041,304
24 : 4,040,126
4,040,289
4,040,357
4,040,381
4,040,605
4,040,669
4,040,703
4,040,742
4,040,747
4,040,802
4,040,810
4,040,858
4,040,903
4,041,135
4,041,217
4,041,265
4,041,298
4,041,391
4,041,468
4,041,489
4,041,491
4,041,500
25 : 4,040,165
4,040,183
4,040,237
4,040,251
4,040,328
4,040,375
4,040,406
4,040,432
4,040,444
4,040,554
4,040,618
4,040,697
4,040,751
4,040,760
4,040,830
4,040,832
4,040,936
4,040,942
4,041,085
4,041,129
4,041,148
4,041,277
4,041,297
4,041,312
4,041,351
4,041,352
4,041,382
4,041,393
4,041,420
4,041,432
4,041,434
4,041,447
4,041,466
4,041,475
4,041,494
4,041,514
26 : Re.29,348
4,040,130
4,040,152
4,040,223
4,040,254
4,040,272
4,040,315
4,040,339
4,040,389
4,040,401
4,040,501
4,040,535
4,040,559
4,040,576

4,040,591
4,040,597
4,040,632
4,040,660
4,040,686
4,040,689
4,040,714
4,040,764
4,040,821
4,040,933
4,040,935
4,040,955
4,040,998
4,041,012
4,041,013
4,041,055
4,041,057
4,041,073
4,041,178
4,041,226
4,041,241
4,041,301
4,041,302
4,041,322
4,041,325
4,041,395
27 : Re.29,343
Re.29,349
4,040,195
4,040,201
4,040,267
4,040,300
4,040,383
4,040,439
4,040,474
4,040,604
4,040,927
4,041,234
4,041,431
4,041,455
28 : 4,040,963
29 : 4,040,182
4,040,363
4,040,384
4,040,637
4,040,659
4,040,799
4,040,806
4,040,857
4,040,862
4,040,865
4,040,904
4,040,978
4,040,991
4,041,056
4,041,179
4,041,202
4,041,435
30 : 4,040,313
31 : 4,040,529
4,040,582
4,040,663
33 : 4,040,743
4,040,771
4,041,358
4,041,388
4,041,525
34 : 4,040,136
4,040,168
4,040,172
4,040,203
4,040,246
4,040,283
4,040,284
4,040,354
4,040,355
4,040,356
4,040,359
4,040,364
4,040,392
4,040,410
4,040,421
4,040,492
4,040,507
4,040,586
4,040,634
4,040,635
4,040,648
4,040,700
4,040,701
4,040,718
4,040,728
4,040,757
4,040,772
4,040,786
4,040,795
4,040,851
4,040,855
4,040,890
4,040,899
4,040,900

4,040,915
4,040,917
4,040,951
4,040,957
4,040,976
4,040,996
4,040,997
4,041,001
4,041,015
4,041,023
4,041,028
4,041,029
4,041,033
4,041,040
4,041,042
4,041,045
4,041,046
4,041,047
4,041,058
4,041,061
4,041,062
4,041,063
4,041,069
4,041,076
4,041,083
4,041,084
4,041,094
4,041,095
4,041,096
4,041,097
4,041,102
4,041,114
4,041,119
4,041,136
4,041,147
4,041,149
4,041,151
4,041,175
4,041,186
4,041,205
4,041,232
4,041,243
4,041,263
4,041,274
4,041,289
4,041,291
4,041,307
4,041,317
4,041,342
4,041,403
4,041,416
4,041,515
4,041,531
35 : 4,040,482
4,040,485
36 : Re.29,347
4,040,125
4,040,149
4,040,157
4,040,159
4,040,171
4,040,191
4,040,225
4,040,233
4,040,277
4,040,279
4,040,285
4,040,366
4,040,374
4,040,386
4,040,414
4,040,416
4,040,419
4,040,428
4,040,440
4,040,445
4,040,460
4,040,473
4,040,475
4,040,515
4,040,522
4,040,566
4,040,574
4,040,583
4,040,590
4,040,600
4,040,610
4,040,616
4,040,647
4,040,655
4,040,657
4,040,675
4,040,692
4,040,707
4,040,708
4,040,711
4,040,717
4,040,725
4,040,758
4,040,781
4,040,785

4,040,790
4,040,804
4,040,814
4,040,827
4,040,844
4,040,848
4,040,849
4,040,868
4,040,869
4,040,871
4,040,874
4,040,882
4,040,886
4,040,891
4,040,892
4,040,893
4,040,895
4,040,898
4,040,905
4,040,916
4,040,959
4,040,968
4,040,969
4,040,987
4,041,010
4,041,014
4,041,035
4,041,070
4,041,104
4,041,117
4,041,122
4,041,146
4,041,185
4,041,200
4,041,229
4,041,249
4,041,253
4,041,254
4,041,261
4,041,278
4,041,345
4,041,361
4,041,364
4,041,380
4,041,442
4,041,450
4,041,454
4,041,480
4,041,485
4,041,488
4,041,492
4,041,501
4,041,502
4,041,510
4,041,524
4,041,536
4,041,544
37 : 4,040,128
4,040,131
4,040,154
4,040,274
4,040,367
4,040,631
4,041,071
4,041,088
4,041,346
38 : 4,040,490
39 : 4,040,134
4,040,196
4,040,229
4,040,236
4,040,281
4,040,326
4,040,380
4,040,449
4,040,463
4,040,464
4,040,466
4,040,471
4,040,476
4,040,498
4,040,504
4,040,555
4,040,567
4,040,595
4,040,662
4,040,676
4,040,691
4,040,749
4,040,755
4,040,770
4,040,777
4,040,780
4,040,852
4,040,867
4,040,908
4,040,918
4,040,925
4,040,928
4,040,934
4,040,939

4,040,988
4,040,999
4,041,005
4,041,165
4,041,167
4,041,208
4,041,215
4,041,237
4,041,238
4,041,252
4,041,259
4,041,260
4,041,279
4,041,286
4,041,300
4,041,320
4,041,339
4,041,344
4,041,377
4,041,433
4,041,449
4,041,498
40 : 4,040,155
4,040,259
4,040,484
4,040,967
4,041,007
4,041,099
4,041,227
4,041,283
4,041,372
41 : 4,040,372
4,040,638
4,040,644
4,040,754
4,040,901
4,041,363
42 : Re.29,345
4,040,170
4,040,180
4,040,188
4,040,216
4,040,275
4,040,286
4,040,296
4,040,304
4,040,317
4,040,323
4,040,331
4,040,371
4,040,376
4,040,382
4,040,448
4,040,456
4,040,458
4,040,551
4,040,557
4,040,564
4,040,654
4,040,690
4,040,704
4,040,705
4,040,798
4,040,808
4,040,809
4,040,843
4,040,854
4,040,876
4,040,877
4,040,888
4,040,911
4,040,913
4,040,924
4,040,945
4,040,953
4,040,956
4,040,960
4,040,971
4,040,983
4,040,984
4,040,990
4,040,992
4,040,993
4,041,004
4,041,006
4,041,008
4,041,037
4,041,067
4,041,068
4,041,087
4,041,107
4,041,123
4,041,128
4,041,139
4,041,155
4,041,162
4,041,194
4,041,196
4,041,273
4,041,285
4,041,337

4,041,347
4,041,404
4,041,408
4,041,470
4,041,543
4,041,547
44 : 4,040,139
4,040,619
4,041,044
4,041,221
45 : 4,040,153
4,041,383
47 : 4,040,147
4,040,801
4,040,922
4,040,923
4,041,011
4,041,116
4,041,305
4,041,465
48 : 4,040,189
4,040,239
4,040,256
4,040,262
4,040,264
4,040,265
4,040,268
4,040,390
4,040,441
4,040,486
4,040,487
4,040,488
4,040,493
4,040,494
4,040,495
4,040,523
4,040,620
4,040,649
4,040,680
4,040,828
4,040,864
4,040,866
4,040,912
4,040,926
4,040,931
4,040,974
4,041,019
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49 : 4,040,388
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4,040,726
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53 : 4,040,137
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4,040,630
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54 : 4,040,282
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4	245,344		245,363		245,321	25	245,300		245,307	42	245,323
6	245,297	9	245,319		245,368		245,305		245,311		245,351
	245,308	10	245,304	18	245,322	26	245,306		245,316		245,362
	245,309		245,310	20	245,371		245,347		245,317	45	245,318
	245,324	12	245,298	24	245,291	27	245,334		245,332	47	245,296
	245,325		245,350		245,292		245,340		245,372		245,364
	245,326	17	245,299		245,293	29	245,349	37	245,302	48	245,333
	245,328		245,303		245,336	31	245,331	39	245,313		245,352
	245,329		245,314		245,337	32	245,359		245,335	49	245,312
	245,348		245,315		245,338	34	245,353		245,367	54	245,343
	245,358		245,320		245,339	36	245,295	41	245,301	55	245,294

PLANT PATENTS

12	4,090										

U. S. GOVERNMENT PRINTING OFFICE : O - 1977

U.S. DEPARTMENT OF COMMERCE
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